Revised August 1996

ECHO BAY MINES LTD.
Oil and Toxic Material
Spill Contingency Plan
Winter Road Project

Table of Contents:

The purpose of the Echo Bay Mines Ltd. (EBM) Oil and Toxic Material Spill Contingency Plan is to outline the means for responding to spills of petroleum products or toxic materials in a way that will minimize potential health hazards, environmental damage, and clean up costs. The objectives of the Plan are:

1. to describe potential health and environmental risks arising from the release of any environmentally hazardous material along the winter road to the mine.

2. to define procedures for the containment and clean up of the spills.

3. to define the reporting procedure and communications network to be used in the event of a spill.

4. to identify specific individuals and their responsiblities in a spill response situation.

5. to provide an inventory of equipment and materials which could be used to safely contain a spill of petroleum or toxic material.

6. to provide a list of contacts through which more equipment and supplies could be obtained in response to a spill.

7. to provide a list of contacts which could provide more detailed information about specific toxic materials and accepted methods of containment, treatment and disposal. The most toxic materials which are to be hauled are Sodium Cyanide and Lead Nitrate.

Petroleum products which could pose an environmental threat in case of a spill include:

- diesel fuel - tanker
- aviation fuel - tanker
- gasoline - tanker
- lubricating oils - cubes or tanker
- hydraulic fluids - cubes or tanker

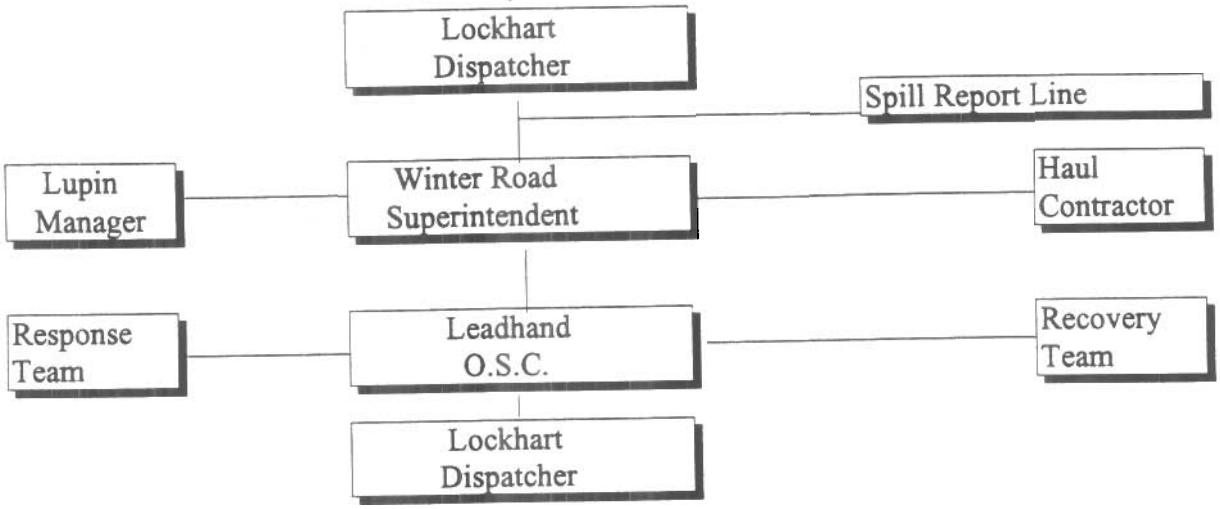
Less toxic substances to be hauled include:

- anfo (ammonium nitrate/fuel oil mixture) - Sealed Van
- ethylene (glycol-based antifreeze) - Flat Deck
- hydrated lime - Flat Deck
- ferric sulphate - Flat Deck

The bulk of the above mentioned substances will be stored and used in the mine/mill complexes with some being used at the exploration camps. All of these materials will be transported to the mine by truck along the winter road during the period of January through April each year.

SECTION 2

NOTIFICATION OF SPILL



RESPONSE TEAM ORGANIZATION

1. Rapid Response Team Training

Key winter road personnel are trained by the Petroleum Industry Training Service in the techniques of product containment, recovery and cleanup in the event of product discharge. These personnel are employees whose regular duties are with construction and maintenance of the road, safety and security or with the haul contractor. Training on recovery of hazardous chemicals will be provided by the suppliers as required. Any recovery of hazardous chemicals that requires the use of self contained breathing apparatus, will be performed by trained personnel from the Lupin Mine Site. This training is also available to the Haul Contractor through the Mine Rescue Station located in Yellowknife, N.W.T.

2. Upon being informed of a toxic/hazardous spill on the Winter Road or at Lockhart or at Lac De Gras, The Winter Road Superintendent and/or his Leadhand(s) shall liaise with the Haul Contractor and offer Echo Bay's assistance in the containment, recovery and clean-up of a spill. Upon notification of a spill he/they will:

a. proceed to the location;
b. assess the situation;
c. make arrangements for first aid and removal of injured personnel;
d. coordinate equipment support (with contractor, dependent on location);
e. make arrangements for necessary personnel required;
f. bring with him/them or have transported to the spill site, the necessary clean-up equipment from that available at the nearest location (Lockhart - Lac De Gras - Lupin - Yellowknife);
g. liaise with Emergency Response Personnel regarding containment, clean-up, and disposal procedures (SPILL REPORT LINE 403-920-8130);
h. make arrangements for removal of damaged vehicles;
i. turn over spill clean-up operation to the contractor on his arrival at the scene;

He/they shall also (if petroleum):

a. protect the life/lives of anyone in the spill area;

b. isolate or remove any potential ignition sources, if possible;

c. locate likely sources or cause of spill and stop flow or release; (DO NOT TAKE UNNECESSARY RISKS)

d. assess the likely size, extent and condition of spill;

e. control access to area until assistance arrives;

f. attempt to contain spread of the spill if possible using available equipment/materials;

g. record all relevant information for reporting purposes;

h. fill out "SPILL REPORT" as completely as possible;

i. mail one copy of the completed form to:

Regional Manager
Water Resources Division
Northern Affairs Program
Indian and Northern Affairs Canada (INAC)
Box 370
Yellowknife, NWT
X1A 2N3

j. retain original report copies, sending copies to:

i) INAC above

ii) Mine Manage(Lupin), General Superintendent(Lupin)

iii) Echo Bay Transportation Attn: Al Philpott 890-4652

iv) Echo Bay Transportation Attn: Andy Hamel 890-4583

v) Lupin Mine Attn: Dave Hohnstein 890-8794

RECOVERY TEAM

The role of the Recovery Team shall be as follows:

a. assemble the necessary personnel and equipment required to contain/clean-up/dispose of the spill

b. ensure all personnel are properly attired or have the proper clothing in their possession (should know what is required because of information passed from spill site);

c. proceed to the scene and report to the Winter Road Leadhand;

d. assess the possibilities of danger to life, environment and equipment/property;

e. if necessary cordon/rope off the area;

f. determine if any chemical is escaping into the environment - remain upwind at all times;

g. under the direction of the Leadhand or his designate take the necessary action required to reduce/stop/control any further chemical or petroleum product from escaping or causing damage to the environment. (DO NOT TAKE UNNECESSARY RISKS);

h. attempt to determine the extent of environmental damage (if any) and whether it extends outside the original containment area;

i. liaise with Emergency Response Personnel regarding clean-up procedures and disposal:

i)	Spill Report Line - Yellowknife	(403)920-8130
ii)	Transportation Emergency Assistants Plan	(403)477-8339
iii)	Canutech	(613)996-6666
iv)	Dupont	(901)357-1546
v)	Transportation Emergency	(800)424-9300
vi)	Explosives Limited	(403)255-7776
vii)	I.C.I. Canada	(800)561-3636

j. The above will require the following information: (use your spill report)

i) Name of Caller - Echo Bay/ Haul Contactor

ii) Name of Shipper - Dupont/Gulf/CIL, etc.

iii) Name of Product - Sodium Cyanide/Lime/Acid, etc.

iv) Point of Departure - Edmonton/Yellowknife/USA

v) Destination - Lupin/Yellowknife

vi) Accident/Incident

1. **Response Team Action**

The role of the Response Team on arrival at a spill (if a fuel tanker) shall be as follows:

a. determine if anyone requires medical attention or is in danger from escaping product;

b. report location of accident/incident;

c. report product involved diesel/gasoline/aviation fuel/glycol, etc.;

d. determine if any product is escaping and

   i) how much

   ii) how to contain/stop/control leak

   iii) install hatch cone for pumping off product (if necessary)

   iv) contain the spill by taking the necessary action (dyking - sorbent booms - pits - etc.)

2. **Recovery Team Action**

a. connect hatch cones to pump off hoses;

b. release hatch lock inside hatch cone cover;

c. open shut-off valve;

d. commence off-loading vehicle;

e. should it not be possible to install hatch cone covers, it may be necessary to puncture the tank on the high side and pump fuel out - "Caution" - a spark proof drill or other non-sparking tool should be used for this recovery procedure.

f. after off-loading is completed, upright vehicle and remove from area;

g. clean up containment area and remove to burn/disposal site;

h. ensure all equipment is cleaned and stored in appropriate location should it be required at a later date (replace any equipment that cannot be used again).

The role of the Response Team after consultation with the Leadhand - O.S.C. or their designates on arrival at a petroleum spill (other than a fuel tanker) should be as follows:

a. assemble the necessary personnel and equipment required to contain the spill;

b. proceed to the scene with the Response Team and coordinate the overall containment/clean-up;

c. assess the possibilities of any danger to life, property, or equipment;

d. determine if any product is escaping;

e. take necessary action required to reduce/stop/contain any further product from escaping;

f. attempt to determine the extent of the damage and how far it extends beyond the original area;

g. if contained within a berm, pump out that which is recoverable, then remove and replace the soil within the berm (transport it to the disposal site and burn it);

h. if outside the berm attempt to determine whether the cause is from overflow or a damaged berm/liner. Should the cause be a damaged liner, repair or replace it, and determine if it would be safe to burn off the spilled fuel or would the surrounding soil have to be removed to a disposal area and burned.

ALERTING AND REPORTING PROCEDURES **SECTION 3**

1. Whenever petroleum products or toxic materials become involved in a spill a potential disaster exists. This may result in loss of life, property or the financial cost of environmental clean up. The rapidity with which a spill is contained, cleaned up and disposed of, the less environmental damage and the lower the financial cost.

2. Therefore, the Contingency Plan deals with spills which might occur enroute to Lupin and or ULU on the Winter Road.

3. Any spill occurring while fuel or toxic materials are being transported on the Winter Road must, and regardless of quantity spilled (Spill Quantities on p. 12), will be reported immediately to the Lockhart Dispatcher who is responsible for notifying the proper authorities and calling the Spill Report Line 920-8130.

   It shall be at the discretion of the Winter Road Superintendent of Echo Bay Mines to determine whether or not the road closure will be implemented until clean up of the spill is complete or a road by-pass is cleared.

AREAS OF CONCERN

The following locations are designated as area of concern:

Winter Road: Grimshaw Trucking's Yard
Echo Bay Hangar and Yard
Lockhart Camp
Lac De Gras Camp
Winter Road to Lupin or ULU

4. Any person(s) discovering or being involved in a petroleum or toxic material spill shall - on the Winter Road - notify:

4. Any person(s) discovering or being involved in a petroleum or toxic material spill shall - on the Winter Road - notify:

TITLE	LOCATION	TELEPHONE
Dispatcher	Lockhart Lake	435-7486
Winter Road Superintendent		429-8750 or 962-6721
Leadhand	Lockhart Lake	H.F. 4765 or 435-7486
Leadhand	Lac De Gras	H.F. 4765 or 435-7412
Leadhand	Yellowknife	920-4835 or 873-1920
Leadhand	Lupin	429-8764 or 8750
	H.F. Radio Frequency	4765.0 - 4441.0
Grimshaw Trucking	Yellowknife	873-4548 or 4542
Lupin Mine Manager	Lupin	429-8787 or 429-5863
or Lupin Assistant Manager	Lupin	
Mgr. Environmental & Regulatory Affairs - D. Hohnstein	Lupin	429-8756 or 487-1795
Insurance Manager - P. Suguira	Edmonton	429-5841 or 467-0309
Safety & Training - A. Stuart	Lupin	429-8779

It shall be the responsibility of the Mine Manager or his designate to notify E.B.M. Officers.

NAME	TITLE	LOCATION	BUS PHONE NUMBER	HOME PHONE NUMBER
*****	Dispatcher	Lockhart	(403)437-9140 FAX: (403)437-9142	**
Al Philpott	Director Transportation	Winter Road	(403)890-4652	(403)986-0363
Andy Hamel	Traffic Superintendent	Winter Road	(403)890-4583	(403)986-0122
Safety	Safety Officer Transportation	Winter Road		
Martin Janssen	Leadhand	Lockhart	(403)437-9140 FAX: (403)890-9142	**
Ron Lebrun	Leadhand	Lac De Gras	(403)438-1246 FAX: (403)435-7412	**
Gilbert Lowe	Leadhand	Yellowknife	(403)920-4835 FAX: (403)920-4409	Cell (403) 873-1920
T.B.A	Leadhand	Lupin	(403)890-8764 (403)890-8750	**
Grimshaw Trucking	**	Yellowknife	(403)873-4548 FAX: (403)873-3470	**
Ian Berzins	Lupin Mine Manager	Lupin	(403)890-8787	(403)432-1453
Rod Cooper	Asst. Lupin Mine Manager	Lupin	(403)890-7000 OR: (403)890-8763	**
Pat Sugiura	Insurance Manager	Edmonton	(403)496-9709	(403)467-0309
Hugh Ducasse	Safety	Lupin	(403)890-8779	**

NOTE: LOCKHART LAKE,LAC DE GRAS AND LUPIN ARE ALSO AVAILABLE ON 4765.0 MHZ AND LUPIN HAS 4441.0 MHZ AS AN ADDITIONAL CHANNEL.

a) On receipt of pertinent data pertaining to petroleum/toxic material spill the following steps shall be taken:

1. fill out "SPILL REPORT" as completely as possible before making report.
2. Report immediately to Yellowknife using the 24 hour Spill Report Line

24 HOUR SPILL REPORT LINE (403) 920-8130

3. Where a fax machine is available follow up immediately by sending a copy of the Spill Report to: **FAX: (403) 873-6924**

NOTE: Telephone calls can be made collect by informing the operator that you wish to report a spill.

EMERGENCY TELEPHONE NUMBERS

Transportation Emergency Assistance Program (TEAP)	403-477-8339
Canutech	613-996-6666
Dupont	901-357-1546
Chemtrec	800-424-9300
Explosives Limited (24 hour number)	403-255-7776
I.C.I. Canada (24 hour number)	800-561-3636

EMERGENCY RESPONSE TEAM

1.	Bill Wood	Lupin
2.	Ron Lebrun	Lac De Gras
3.	Lynden Zwingli	Lac De Gras
4.	Phil Flaumitsch	Ulu
5.	Don Stauffer	Lockhart Lake
6.	Martin Janssen	Lockhart Lake
7.	Kevin Mealy	Lupin
8.	Hugh Ducasse	Lupin

9.	Gilbert Lowe		Yellowknife
10.	Andy Hamel		Lockhart Lake
11.	On Site Security	(6 people)	Security
12.	Larry St. Jean		Yellownkife
13.	Jim Lepine		Dome Lake
14.	Jeff Bush		Ulu
15.	Richard McPherson		Ulu

TABLE I

Quantities or Levels for Immediate Reporting

Item	Column I Class and Division	Column II Quantities or Levels
1.	1	All
2.	2.1	At least 100 L*
3.	2.2	At least 100 L*
4.	2.3	All
5.	2.4	All
6.	3	At least 200 L
7.	4	At least 25 kg
8.	5.1	At least 50 kg or 50 L
9.	5.2	At least 1 kg or 1 L
10.	6.1	At least 5 kg or 5 L
11.	6.2	All
12.	7	Any discharge or a radiation level exceeding 10 mSv/h at the package surface and 200 uSv/h at 1 m from the package surface.
13.	8	At least 5 kg or 5 L
14.	9.1	At least 50 kg
15.	9.2	At least 1 kg
16.	9.3	At least 5 kg or 5 L

* Container capacity

All spills or potential spills of petroleum products or other hazardous materials must be reported to the 24-hour Spill Report Line to ensure that an investigation is undertaken by the appropriate government authority.

ᑯᐃᓕᒻᒥᑦ ᐅᕐᓂᔪᓐᓇᑦ ᑯᐃᑐᐃᓐᓇᒪᖅᓴᑦ ᐅᖃᓗᒍᓕᕆᔨᐃᑦ ᐅᕐᓂᔪᓐᓇᑦ ᐊᑐᑦᓇᓴᑦ ᐊᓗᓂᑦ ᐅᖄᐅᓗᐅᑕᐅᑎᕆᓚᖅᖄᓴᑦ 24-ᓂᓗ ᐃᑲᖅᓂᓗ ᒪᑐᐃᓐᓇᓚᒥᑦ ᐅᖄᓚᐅᒪᒥᑦ ᑕᐃᓐᓇ ᖄᐅᔪᓴᓴᑕᐅᑎᖅᑭᓐᓇᓚᖅᑐᓂᓗ ᐃᓚᖓᑕᓂᓗ ᑲᑎᒪᓂᓐᓂᑦ ᐊᔨᓴᖅᓂᓐᓂᖅᓂᓗ.

SPILL REPORTING PROCEDURE

1. Fill out "SPILL REPORT" form as completely as possible before making the report.

2. Report IMMEDIATELY to Yellowknife using the 24-hour Spill Report Line.

24-HOUR SPILL REPORT LINE
(403) 920-8130

3. Where facsimile machine is available, follow up immediately by sending a copy of the Spill Report.

FACSIMILE: (403) 873-6924

NOTE: Telephone calls can be made collect by informing the Operator that you wish to report a spill.

4. RCMP communications may be used if other means are not available.

ᑯᐃᐊᖅᖄᓕᒻᒪᑕᐃᒍ ᖃᓄᐅᓕᕆᔨᖄᓚᐅᖏᓐᓂᑦ

1. ᑎᑎᕋᔭᒍ "ᑯᐃᓚᓄᑦ ᐅᓂᒃᑳᐅᑎᒃᐳᓂᖅ" ᑎᑎᕋᖅᑭᔪᓐᓇᖅᓴᖅ ᑕᐃᓐᓇ ᑯᐃᓚᖅ ᐅᖃᓪᓚᐊᑎᓪᓗᒍᓐᓇᖅᓂᓕᕋᓗ.

2. ᐅᖄᐅᓚᓕᑐᑎᒍᔭᒍ ᓴᔭᓇᐃᓐᓕᑦ ᑕᐃᓐᓇ ᐊᑐᕐᔭᒍ 24-ᓂᑦ ᐃᑲᖅᓄᑦ ᒪᑐᐃᓐᓇᖅᓴᖅ ᐅᖃᖅᑎᐅᓴᖅ ᐅᖃᓪᓚᐅᑦ.

24-ᓂᑦ ᐃᑲᖅᓄᑦ ᑯᐃᓚᓄᑦ ᐅᖅᑲᓚᐅᑦ
(403) 920-8130

3. ᓚᖓᑐᓂᑦ ᑎᑎᕐᐅᑎᐅᔨᓪᓕᐊᓂᖅ ᐊᑐᐃᓐᓇᑕᖃᖅᑕᖅᑭᑦ, ᑎᑎᕋᖅᑭᔪᓐᓇᖅᓴᖅ ᑎᑎᓚᐅᑦᔭᒍ ᐊᐅᓚᑦᓇᑕᐅᑎᒃᓴᑎᓂᑦ ᐅᓂᒃᑳᖏᓐᓇᓚᖅᑐᓂᖅ ᐊᓕᔪᖏᓂᖅ.

ᑯᐃᓚᖅᖄᓚᑦ ᓚᖓᑐᓂᑦ ᓇᓕᐅᑉᑲ
ᓚᖓᑐᓂᑦ (403) 873-6924

ᖃᐅᔨᒪᔭᐅᔪᓚᓂᖅ: ᐅᖃᓚᓂᐅᔪᑦ ᑲᓂᒃᑲᖏᓐᓇᓚᖅᑐᓂᖅᓂᓗ ᐅᖃᐅᑎᒍᔭᒍ ᐅᖃᓚᐅᔪᓚᐅᖅ ᑯᐃᓚᖅ ᐅᖃᐅᓚᖃᖅᓴᓕᕆᓂᖅᓂᓗᑎᑦ.

4. ᕿᓂᓚᐅᑯᑎᒍᑦ ᐅᖃᖅᓴᓐᒥᔪᓚᐅ ᐊᓚᖓᓂᓂᖅ ᐊᐅᓚᑦᓇᑕᖃᖅᓴᖅᑭᓐᓂᕿᑦ.

Additional Information or Assistance:

ᐊᓚᖓᑦ ᑐᓴᖅᑎᑎᑎᑕᐅᓴᖅᓂᑦ ᐃᑲᔪᖅᓴᖅᓂᒃᑲ:

Government of the Northwest Territories
Pollution Control Division, Yellowknife
Phone: (403) 873-7654
Fax: (403) 873-0221

ᓄᓇᕗᑦ ᑲᑎᒪᓂᖅᓂᑦ ᓇᖅᑕᐃᐅᓪᓚᕆᔨᓂᖅᓄᑦ, ᓴᓇᐃᐊᖅ
ᐅᖃᓕᒫᑦ: (403) 873-7654
ᓚᖓᑐᓂᑦ: (403) 873-0221

Department of Indian Affairs and
Northern Development, Yellowknife
Phone: (403) 920-8240
Fax: (403) 873-9318

ᐃᓄᓕᕆᔨᒃᑯᓂᑦ, ᓴᓇᐃᐊᖅ
ᐅᖃᓕᒫᑦ: (403) 920-8240
ᓚᖓᑐᓂᑦ: (403) 873-9318

Environment Canada, Yellowknife
Phone: (403) 920-6060
Fax: (403) 873-8185

ᐊᑭᑎᓕᕆᔨᒃᑯᓂᑦ, ᓴᓇᐃᐊᖅ
ᐅᖃᓕᒫᑦ: (403) 920-6060
ᓚᖓᑐᓂᑦ: (403) 873-8185

Northwest Territories

N.W.T. SPILL REPORT (Oil, Gas, Hazardous Chemicals or other Materials)

ᓄᓇᕗᑦ ᑯᐊᓕᓂ ᐅᓂᒃᑳᖅ (ᐅᖃᐅᓯᐅᑦ, ᓴᓇᓪ, ᐊᑦᑕᓐᓇᖅᑐᑦ ᐃᓕᓴᐃᑦ ᐅᑎᕐᓯᓚᐅᖅ)

24-Hour Report Line
24-ᓂᑦ ᐃᑲᖏᓂᑦ ᐅᓂᒃᑳᖏᐊᔪᓐᓇᖅᑐᖅ ᐅᖏᓪᓗᑎᒃ
Phone/ᐅᖏᓪᓗᑎᒃ (403) 920-8130
Fax/ᓱᒃᑐᐃᓂᒃ (403) 873-6924

A Report date and time
ᐅᑎᓂᖅ ᔪᕐᓇᐅᔭᓕ ᖃᓄᐃᓕᖅᑐᓂᒃ ᐅᓂᒃᑳᐊᑎᑦᓂᒃ

B Date and time of spill (if known)
ᐅᑎᓂᖅ ᑯᐊᑎᓂᒃ ᖃᓄᐃᓕᖅᑐᓂᒃ (ᖃᐅᔨᓴᕐᓂᖅ)

C ☐ Original report ᓱᓕᓕᖅᓯᒪᔪᖅ ᐅᓂᒃᑳᐊᑎᑦᓂᒃ
☐ Update no. ____ ᐅᓂᒃᑳᐊᑎᖃᕐᓂᖅ ᓄᐊᑦᑕ ____

Spill number
ᑯᐊᑦᑦ ᓄᐊᑦᑕ
P. 15

D Location and map coordinates (if known) and direction (if moving)
ᓄᓂ ᑯᐊᑉ ᖃᓪᓗᓂ ᓂᓪᓴᔪᑦ ᓄᐊᑎᑎᖅᑐᑦ (ᖃᐅᔨᓴᕐᓂᖅᑐᑦ) ᖃᓪᓗᓂ ᓇᑦᓴᓚᐅᑦᓯᐊᓴᖅᓱᑦ (ᐃᓴᖅᓯᕐᓯᑦ)

E Party responsible for spill
ᑭᓇᐅᑦ ᑯᐊᑎᒋᑎᑦ

F Product(s) spilled and estimated quantities (provide metric volumes/weights if possible)
ᑭᓇᐅᑦ ᑭᓇᔨᓂᒃᑯᑦ ᑯᐊᑦ ᖃᓄᐃᓗ ᐊᖏᓂᖃᖅᑐᑦ (ᐊᖏᓂᓱᓐ ᐅᑭᐅᓂᖅᓴᓇᔨᓂᒃᑯᑦ ᐊᓯᓴᓐᓂᑦᑐᑦ)

G Cause of spill
ᑭᓱ ᑯᐊᐳᓯᑎᑦ

H Is spill terminated?
ᑯᐊᑦᑦ ᓄᖅᑎᑎᑎᑦ?
☐ yes/ᐃ ☐ no/ᐊᖅ

I If spill is continuing, give estimated rate
ᓴᓂ ᑯᐊᑦᑦ ᖃᓄᐃᓗ ᑭᓚᒥᖅᑐᑦ

J Is further spillage possible?
ᑯᐊᖅᓂᔨᐃᓐᓇᓕᖅᑐᖅ?
☐ yes/ᐃ ☐ no/ᐊᖅ

K Extent of contaminated area (in square metres if possible)
ᖃᓄᐃᓗ ᐊᓯᖏᓂᑦ ᑯᐊᑦᑕᐃᑦ (ᐅᐃᓂᓕᓚᐅᑦ ᐊᓯᓴᓐᓂᑦᑐᑦ)

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)
ᑭᓇᐅᑦ ᐱᐳᓯᑎᑦ ᑯᐊᑕᒻ ᑭᖑᓂᑎᒋᔪᓂᒃ ᐳᓴ ᖃᓄᓕᓴᓂᓴᓂᒃ, ᓄᓇ ᖃᓄᓕᓴᓂᓴᓂᒃ ᐊᐅᓚᐅᓕᓴᓂᓗ, ᐊᓯᖏᓚᐅᓴᓂᒃᓱᓗ)

M Containment (natural depression, dykes, etc.)
ᐅᖃᐅᓯᖃᑦᑕᐃᑦ ᑭᓪᓕᒃ ᐃᓕᖅᓴᓂᖅᓯᒪᔪᖅ ᓗᓂᒻ ᐃᓕᖅᑐᑦ, ᐊᓯᖏᓚᐅᓴᓂᒃᓱᓗ

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials
ᖃᓄᐃᓕᓚᐅᑎᑦ, ᖃᓄᐃᓕᓚᐅᑎᖅᑐᑦ ᐅᑭᐅᓂ ᖃᓄᐃᓕᓚᐅᑎᖅᑐᖅᑐᑦ ᐊᑕᐅᓯᖅᑎᑕᐅᓂᖅᓴᓂ, ᓄᖅᑎᑎᑕᐅᓂᖅᓴᓂ, ᓴᓚᒥᖅᑕᐅᑎᑦ ᐅᑭᐅᓂ ᐃᓕᑕᐅᓂᖅᑐᑦ ᑯᐊᑦᑦ (ᑯᐊᑦᓯᐊᓂᒃᑯᑦ) ᖃᓪᓗᓂ ᑯᐊᐳᖅᑎᑦ.

O Do you require assistance?
ᐃᑲᓂᑕᐅᔭᓇᖏᓐᓄᑦ?
☐ no ᐊᖅ ☐ yes, describe: ᐃ - ᓄᓕᐃᑲᔪᓐᓇᔭᓗᒍ

P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife
ᖃᓄᑕᓗᐃᓐᓇᖏᓐᓄᑦ ᐃᓄᓐᓂᑦ, ᐱᖓᓱᓐᓂᔭᓕᑦ ᐅᑭᐅᓂ ᐊᑎᒪᓕ ᓴᓇ - ᐃᓕᓴᓂᓂ, ᐃᓕᓴᓕ ᓂᐅᖏᓐᓄᑕᐅᓇᓕᓴᓂᓂ, ᐃᖏᔨᓕᓂᑦ ᐅᑭᐅᓂ ᓂᓴᓕᓂᑦ

Q Comments and/or recommendations ᐅᖏᐅᓴᐃᑦ ᑯᐊᑎᓗ ᐅᑭᐅᔭᓂᑦ ᖃᓄᐃᓕᓴᖏᓚᐅᑦᑐᑦ

FOR SPILL LINE USE ONLY
ᐊᐅᓚᐅᑦᓴᓇᖅ ᑯᐊᑦᑦ ᐅᖏᓪᓗᓂᒃᐃᑦᑐᖏᓐᓄᓕᐊᖅ

Lead Agency
ᐃᓄᖃᐃᖅᑐᓂᓕᓴᐃᑦ ᑯᐊᑦᑐᖅ ᑲᒪᓂᖅᓯᒪᔭᑦ-

Spill significance
ᑯᐊᑦᑦ ᖃᓄᐃᓕᓴᓂᖅ-

Lead Agency contact and time
ᐃᓄᖃᐃᖅᑐᓂᓕᓴᐃᑦ ᑯᐊᑦᑐᖅ ᑲᒪᓂᖅᓯᒪᔭᑦ ᖃᐅᔨᓴᕐᓂᖅᑐᓂᒃᑯᓂᖅ ᑯᓪᓗᓂ ᖃᓄᐃᓕᖅᑐᑦ

Is this file now closed?
ᑕᓐᓇ ᐅᑭᐅᓂᓚᐅᑦᑐᖅ ᒪᓕᐅᑦᑐᑦ?

Reported by ᐅᑭᐅᓂᒃᑯᓐ	Position, Employer, Location ᖃᓄᐃᓐᒥᑦ ᐃᓄᖃᐃᖅᑐᓂᑦ, ᐃᓄᖃᐃᖅᑐᓂᖅᓯᒪᓂᖅ ᓇᒥ	Telephone ᑎᓴᒪᓂ
Reported to ᑭᓱᓂᑦ ᐅᑭᐅᓂᒃᑯᑦᑐᖅ	Position, Employer, Location ᖃᓄᐃᓐᒥᑦ ᐃᓄᖃᐃᖅᑐᓂᑦ, ᐃᓄᖃᐃᖅᑐᓂᖅᓯᒪᓂᖅ ᓇᒥ	Telephone ᑎᓴᒪᓂ

NWT 1752/0593

SECTION 4

SPILL CONTAINMENT/RECOVERY EQUIPMENT - LOCATION

Spill containment/recovery equipment shall be at Yellowknife, Lockhart and Lac De Gras. It shall include but not be limited to:

Manpower
Heavy Equipment ie. loaders, dozers, trucks & tankers
Sorbent Booms & Pads
Valves & Fittings
Hatch Cone Covers
Pumps & Parts
Polyethylene
Shovels - Assortment
Tiger Torches & Propane Bottles
Needle Bars and/or Ice Chisels
Ice Augers, Parts & Extensions
Hoses (of various sizes) & Fittings
Chainsaws & Parts
Hammers (varying sizes)
Lumber
Pri-Bars
Cable Cutters
Fire Extinguishers
Cable Slings & Shackles
Rakes & Pitch Forks
Dust Masks

All equipment is in a self contained van and is stored in such a manner as to be readily available on short notice. On completion of each spill response exercise, all equipment and materials are cleaned / replaced and stored for further use should the need arise.

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- Pumps & Parts
- Polyethylene
- Shovels - Assortment
- Tiger Torches & Propane Bottles
- Needle Bars and/or Ice Chisels
- Ice Augers, Parts & Extensions
- Hoses (of various sizes) & Fittings
- Chainsaws & Parts
- Hammers (varying sizes)
- Lumber
- Pri-Bars
- Cable Cutters
- Fire Extinguishers
- Cable Slings & Shackles
- Rakes & Pitch Forks
- Dust Masks
- Sphag Sorb
- Warm up Shack complete with Generator

All equipment is in a self contained van and is stored in such a manner as to be readily available on short notice. On completion of each spill response exercise, all equipment and materials are cleaned / replaced and stored for further use should the need arise.

GOVERNMENT AGENCIES **SECTION 5**

Government of the NWT

* Mr. Ken Hall	Business:	873-7654
* Mr. Harvey Gauker (Alternate)	FAX:	873-0221
* Mr. Neil Thompson (Alternate)		
* After hours Spill Line:		920-8130

Government of Canada

* INAC Land Use & Water Use	FAX:	873-5763
* Mr. Kevin McDonnell, Water Resources	Business:	920-8238
* Mr. Howard Madill, Land Use	Business:	920-8257
* Mr. Jim Umpherson, Reg. Mgr., Land Use	Business:	920-8165

EPS

* Mr. Magnus Bourque	Business: FAX:	920-6060 873-8185
* Mr. Dave Tilden	Business: FAX:	920-6060 920-6054

Spill Report Line

NWT Spill Line	Telephone: FAX:	920-8130 873-6924

EMERGENCY TELEPHONE NUMBERS

Transportation Emergency Assistance Plan	(403) 477-8339
Canutech	(613) 996-6666
Dupont	(901) 357-1546
Chemtrec	(800) 424-9300
Explosives Limited	(403) 255-7776
ICI Canada	(800) 561-3636

Sorbents		(403) 986-4544
C.I.L. Stanchem	After hrs	(403) 424-1754
Envirotech Nisku Inc.		(403) 387-3566
Earth Care Products (sphag sorb)		(403) 468-5444

ACTION PLANS

The following pages contain "Action Plans", one for each type of substance which, if spilled in a significant amount at sensitive locations, could cause noticeable environmental damage. Each action plan contains the following:

a. suggested initial spill response actions
b. notable hazards of the material(s)
c. suggested action for fire, if applicable
d. recommended recovery methods
e. recommended disposal methods
f. basic properties of the material(s)
g. statement of potential environmental threat posed by the material(s)
h. description of the containers used for transportation and storage of the materials
i. name of the supplier of the material(s)
j. applicable first aid procedures (where available)

Each action plan is intended to be a guide for an OSC (On Scene Commander) or Haul Contractor. Because it is impossible to address every potential spill situation along the winter road, the action plans have been formulated to suit the more likely spill possibilities, and may not be applicable in every case. The ultimate decision-making responsibility for spill response actions must lie with the OSC.

As referenced early in this plan, training courses are provided as required to assure proper response techniques, each staff member directly involved in the winter road program and in contact with potential spill situations will be issued with a spill response handbook, which will outline the procedures to follow for response, containment, clean-up and disposal of spill contaminants.

MATERIAL SAFETY DATA SHEETS

&

ACTION PLANS FOR SPILLS OF:

a.Diesel Fuel

b.Gasoline and Aviation Fuel

c.lubricating and Hydraulic Oils

d.Ethylene Glycol Antifreeze

e.Sodium Cyanide

f.Hydrated Lime

g.Soda Ash

h.Class I Explosives

i.Lead Nitrate

j.Ferric Sulphate

SPILL CONTAINMENT, RECOVERY &DISPOSAL **SECTION 6**

(Petroleum Products)

a. Containment - Oil leaking out of the vents of an overturned tanker or through a crack or puncture in a tanker wall may be stopped by means of various plugging/ patching/sealing devices and/or compounds. Containment may thus be effected within the tanker itself.

Oil spilling onto frozen snow covered terrain may be contained by constructing a dyke out of snow. Dykes can be built either manually with shovels or with heavy equipment such as graders and bulldozers where practical. The impermeability of dykes (and hence the containment efficiency) may be ensured by lining the dyke with a polyethylene plastic liner, plastic tarpaulin or similar synthetic material. Alternatively, in sub-zero temperatures, water may be sprayed or poured over the dykes. The water will freeze in place forming a relatively impervious barrier to the oil. The latter method assumes that water is available or may be accessed from the spill site. Synthetically lined dykes are more effective than just snow or snow and ice-lined dykes. Oil spilled onto an ice surface of a river or lake may also be contained by snow dykes.

Containment dykes may also be constructed from sand or gravel if such materials are available in an unfrozen form. Trucks or other heavy equipment will normally be required to transport and handle sand and gravel, though the dykes themselves can be fashioned manually with shovels.

Trenching or ditching can be used as a method for containing and/or intercepting the flow of oil from land spills. Heavy equipment such as dozers are available on the Winter Road. Ice and snow, loose sand, gravel and surface layers of organic material can usually be scraped or dug away until a solidly frozen substrate is reached. Trenching in solid frozen ground or rocky substrates is normally neither practical nor possible.

Containment of oil under an ice surface is a very difficult task and oil should be stopped from entering water. First one has to know where the oil is. The simplest and most economic technique for detecting where the oil is, is to drill holes through the ice using an ice auger. In a river, once the oil is located, slots may be cut in the ice using chain saws. Once the ice blocks are removed the oil will rise into the slots and be amenable to recovery or disposal by on site burning. Containment of oil under river ice is difficult in practice. Containment of oil under lake ice is virtually impossible.

b. Recovery - Diesel oil can sometimes be off-loaded from a leaking tank trailer through the dispensing manifold or by suction hose though the hatch covers on top of the trailer. Unfortunately, this is not always possible with a tank trailer which is turned over on its side or in an upside down position. A second method of off-loading a leaking tanker would entail putting a hole in the tanker compartments with a spark-proof drill or other non sparking tool and pumping the tank contents to a standby vessel, to avoid igniting vapours contained within the tanker. This technique would not be suitable for highly volatile products like gasoline but could work on less volatile substances, such as diesel oil. Fire and safety consultants as well as salvage experts would have to be consulted to develop a safe but workable technique for this type of recovery operation. Safety shall be paramount.

Spilled fuel contained within a dyked area can be recovered by pumping it into a standby tanker. The standby tanker pump, if available, will normally be able to accomplish the task. Alternately, a portable pump may be utilized. Spilled oil contained in dykes, trenches, or pooled on the ground may also be picked up by means of a vacuum truck.

Fuel which has collected in ice slots or holes drilled through the ice can be picked up by suction hoses connected to either a portable pump, vacuum truck, or standby tanker. Suction hoses should be screened at the suction end to prevent snow, ice or debris from clogging the line or pump. Portable pumps and power augers have a habit of freezing up or being difficult to operate in extreme cold. A Hermann-Nelson type heater may be used when available to alleviate freeze-up problems.

Sorbent materials can be very useful in recovery operations for picking up oil which cannot be recovered by pumping or other means. Natural sorbents include straw, peat moss and sawdust. Synthetic sorbent pad materials such as 3M Brand, Conwed and other commercial products that are efficient than natural sorbents. Shovels, rakes, and pitchforks are invaluable in any oil spill clean-up and recovery operation.

Bladder type fuel tanks may be used to store recovered oil and have the advantage of being readily portable. An economic and simple means of storing recovered oil, used sorbents and oil containment debris is to use 45 gallon drums.

c. Disposal - Oil which has been recovered by pumping into portable tanks, drums or a standby tanker can often be reclaimed and reused. Water and debris can be separated from the pure fuel by gravimetric means in a tank. In this manner, financial losses can be cut and the disposal problem reduced.

The simplest means of disposal is by in-situ combustion. The most efficient means of igniting diesel oil for in-situ combustion is with a large size portable propane torch, otherwise known as a tiger torch. Highly flammable products such as gasoline or alcohol, or combustible products, such as wood, may also be used to promote ignition of a spilled product. The objective is to raise the temperature

of the spilled product to its fire point, whereby sustained combustion will be possible. Spilled oil should be ignited where it has pooled naturally or been contained by dykes, trenches or depressions. Oil which has collected in slots in river ice may also be disposed of by in-situ combustion if sufficient holes are drilled in the ice. Once all the holes are drilled, the oil which collects in the holes may be ignited.

Liquid oil wastes (which cannot be reclaimed), oil contaminated snow and debris and oil residues left after in-situ combustion will be picked up and disposed of at a land disposal site approved by government authorities. Disposal sites exist along the winter road corridor and are in general terms located at abandoned gravel pits which have been approved by INAC--Land Resources. Disposal at local municipal dumps may be an alternative if required, in this case GNWT would be consulted. Burning of oily residues at these disposal sites may be possible once warm weather returns. Appendix A is a map showing the winter road alignment and approved disposal site locations.

Dump Sites:

Dry Bones Lake
North Gordon lake
North Waite Lake
Portage #1
Portage #10
Lupin Mine

Prior to the use of a disposal site the proper authorities will be contacted for approval.

Prior to any burning at any location the proper government authorities will be contacted for approval.

ACTION PLANS

The following pages contain 10 "Action Plans", one for each type of substance which, if spilled in a significant amounts at sensitive locations, could cause noticeable environmental damage. Each action plan contains the following:

a. suggested initial spill response actions
b. notable hazards of the material(s)
c. suggested action for fire, if applicable
d. recommended recovery methods
e. recommended disposal methods
f. basic properties of the material(s)
g. statement of potential environmental threat posed by the material(s)
h. description of the containers used for transportation and storage of the materials
i. name of the supplier of the material(s)
j. applicable first aid procedures (where available)

Each action plan is intended to be a guide for an OSC (On Scene Commander) or Haul Contractor. Because it is impossible to address every potential spill situation along the winter road, the action plans have been formulated to suit the more likely spill possibilities, and may not be applicable in every case. The ultimate decision-making responsibility for spill response actions must lie with the OSC.

As referenced early in this plan, training courses are provided as required to assure proper response techniques, each staff member directly involved in the winter road program and in contact with potential spill situations will be issued with a spill response handbook, which will outline the procedures to follow for response, containment, clean-up and disposal of spill contaminants.

ACTION PLAN FOR SPILL OF DIESEL FUEL

Initial Spill

Response
- STOP the flow if possible
- CONTAIN flow of oil by dyking, barricading or blocking flow by any means available. Use earth moving equipment if nearby
- if flow has reached flowing natural stream, mobilize team to deploy river boom, skimmer, and sorbent booms
- if possible, pump fuel into a tanker unit

Hazards
- slightly toxic by ingestion, highly toxic if aspirated
- flammable

Action for fire
- use carbon dioxide, dry chemical, foam, or water spray (fog), although water may spread the fire
- use fog streams to protect rescue teams and trapped people
- use water to cool surface of tanks
- divert the diesel fuel to an open area and let it burn off under control
- if the fire is put out before all diesel fuel is consumed, beware of re-ignition
- where diesel fuel is running downhill, try to contain it as quickly as possible
- rubber tires are almost impossible to extinguish after involvement with a fire. Have vehicles with burning tires removed from danger area

A. DIESEL FUEL

Recovery

- unburned diesel fuel can be soaked up by sand and peat moss, or by chemical sorbents such as Graboil or Conwed
- if necessary, contaminated soil should be excavated
- diesel fuel entering the ground can be recovered by digging sumps or trenches
- diesel fuel on a water surface should be recovered by skimmers and sorbent booms (See Section on Recovery of Oil Spills).

Disposal

- incineration under controlled conditions
- burial at an approved site.

Properties

- chemical composition: mixture of hydrocarbons in the range C9 to C18
- clear, oily liquid
- not soluble, floats in water

Environmental

Threat

- moderately toxic to fish and other aquatic organisms
- harmful to waterfowl
- may create unsightly film on water

Containers

- transported by tanker truck and stored in the tank farm

Supplier

- As per annual tendering

MATERIAL SAFETY DATA SHEET

PETRO-CANADA

WHMIS CLASSIFICATION

Combustible Liquid (Class B3)
Poisonous Material (Class D2)

PRODUCT CODE: N/A

DATE PREPARED: April 1, 1992

SECTION I MATERIAL IDENTIFICATION

Trade Name:	DIESEL FUEL
Other Names:	Diesel 20K, 0, 15, 20, 25, 30, 40, 40S, 50, 60 Diesel AA, Diesel GM 35, 45 Domestic Marine Diesel
Chemical Synonyms and Family:	Petroleum hydrocarbon
Name of Manufacturer/Supplier Address & Emergency Phone Number:	Petro-Canada (403) 296-3000 P.O. Box 2844, Petro-Canada Centre Calgary, Alberta T2P 3E3
Poison Control Centre Numbers:	Consult local telephone directory for emergency numbers.
Application:	Diesel fuels are distillate fuels suitable for use in high and medium speed internal combustion engines of the compression ignition type.

SECTION II TRANSPORTATION

UN Number: 1202 Primary Classification: 3.3 Subsiduary Classification: NR

Compatibility Groups: N/A CANUTEC Transport Emergency No. (613) 996-6666

SECTION III COMPOSITION

COMPONENTS	ALLOWABLE LIMITS (8 h)	% (VOL.)	CAS #
Complex mixture of petroleum hydrocarbons* (C_9 - C_{18}).	5 mg/m^3 (oil mist)**	>99.9	68334-30-5
Anti-static additive, cetane improver, pour point depressant.	N/A	<0.1	N/A

* Aromatic content is 38% maximum (benzene nil)
** Petro-Canada recommendation.

NR-Not Regulated N/A-Not Applicable U-Unknown

Cette fiche est aussi disponible en français.

SECTION IV PHYSICAL DATA

Density: (@15°C)	0.78-0.90 kg/L	Boiling Point/Range: (@ 1 atm)	145-371°C (approx.)
Vapour Pressure: (@ 25°C)	1 kPa (approx.)	Percent Volatile: (@ 20°C)	U
Vapour Density: (@ 20°C)	4.5 (approx.)	Evaporation Rate:	N/A
Solubility in Water:	Insoluble		
Viscosity (Kinematic): (@ 40°C)	1.2-4.1 cSt		
Pour Point:	-50 to -6°C (-58 to 20°F)	Appearance: & Odour	Clear to yellow, bright oily liquid with hydrocarbon odour.**

** May be dyed purple or red for taxation purposes.

SECTION V FIRE & EXPLOSION DATA

Flash Point (method used= COC):	40°C (minimum)
Flammable limits in air (% by volume):	Lower 0.7% Upper 6.0%
Auto-ignition Temperature:	>225°C
Fire and Explosion Hazards:	Treat as combustible liquid. Do not cut, drill or weld empty containers.
MODERATE FIRE HAZARD	
Extinguishing Media:	Dry chemical or carbon dioxide for small fires. Water spray or foam for large fires.
Fire Fighting Procedures:	Use full protective equipment and self-contained breathing apparatus. Cover with extinguishing agent. Use water spray to cool fire-exposed containers and as a protective screen. Do not point solid water stream directly into burning product to avoid spreading fire.

SECTION VI HEALTH HAZARD INFORMATION

Toxicity Data	* Estimated acute LD_{50} =7650 mg/kg (rat, oral): practically non-toxic. Rabbit primary dermal irritation index (Draize) = 6.8: extremely irritating. Rabbit eye irritation index (Draize) = 0: non-irritating.
Effects of Overexposure	
Inhalation:	Inhalation of vapours or mist will cause headaches, nausea, dizziness, and intoxication; severe central nervous system depressant.
Skin and Eyes:	Irritation, defatting and drying of skin. Prolonged exposure to skin may cause chapping, cracking or possibly dermatitis. Eye contact may cause irritation, but not permanent damage.
Ingestion:	Ingestion is unlikely.

* Based on API Study #79-6 on diesel fuel where LD_{50}=9.0 mL/k (rat, oral).

Emergency and First Aid Procedures Information

Skin: Remove contaminated clothing - launder before reuse. Soap and water wash. Discard saturated leather articles.

Eyes: Copious warm water flush - 15 minutes. Physician assessment mandatory.

Inhalation: Evacuate to fresh air. Apply Cardio Pulmonary Resuscitation if required. Administer oxygen if available. If resuscitation is required, physician assessment is mandatory.

Ingestion: DO NOT INDUCE VOMITING. If vomiting - take care to prevent aspiration. Give 250 mL. (1/2 pint) of milk to drink. Mandatory physician assessment.

Notes to Physician: Gastric lavage should only be done after endotracheal intubation in view of the risk of aspiration which can cause serious chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

SECTION VII — REACTIVITY DATA

Stability:	Stable under normal storage and use.
Conditions to avoid:	Excessive heat, sources of ignition, formation of oil mist.
Materials to avoid:	Strong oxidizing agents (strong acids, peroxides, chlorine, etc.).
Hazardous Decomposition products:	CO_2, SO_2, smoke on combustion.
Can hazardous polymerization occur?:	No.

SECTION VIII — SPILL OR LEAK PROCEDURES

Steps to be taken if material is released or spilled:	Avoid contact. Use full protective equipment and breathing apparatus if required. ELIMINATE IGNITION SOURCES. Contain spill. Absorb with inert absorbent such as dry clay, sand or diatomaceous earth, commercial sorbents, or recover using electrically grounded explosion-proof pumps. Place absorbent in closed metal containers. DO NOT FLUSH TO SEWER.
Waste Disposal Method:	Dispose in approved, SECURE contaminated waste landfill site or licenced waste reclaimer facility. Check with applicable jurisdictions for specific disposal requirements.

SECTION IX SPECIAL PROTECTION INFORMATION

Ventilation:	General ventilation. Use explosion-proof mechanical ventilation suitable for group D atmospheres.
Respiratory Protection:	Up to 5 mg/m^3 (oil mist), none required. From 5 to 50 mg/m^3, use an approved organic vapour respirator suitable for oil mist in areas with sufficient oxygen. Above 50 mg/m^3, use full-face air-supplied or self-contained breathing apparatus.
Protective Gloves:	For direct contact with hydrocarbons of more than 2 hours, VITON or NITRILE reccomended. Otherwise, PVC gloves may be worn.
Eye Protection:	Chemical goggles if splashing likely.
Other Protective Clothing:	Wear long sleeved clothing to minimize skin contact.

SECTION X SPECIAL PRECAUTIONS

Store in cool, well-ventilated area. Electrically ground/bond during pumping or transfer to avoid static accumulation. AVOID SKIN CONTACT AND INHALATION. Practice good personal hygiene. DO NOT SIPHON BY MOUTH OR USE AS A CLEANING SOLVENT. Launder work clothes frequently. Petro-Canada recommends an allowable exposure of 5 mg/m^3 (oil mist) when handling DIESEL FUELS.

SECTION XI REFERENCES

ACGIH. Threshold Limit Values and Biological Exposure Indices for 1991.
CONCAWE. First Aid Measures, Medical Toxicology Data and Professional Advice to Clinicians on Petroleum Products. Feburary 1983.
API. Petroleum Process Stream Terms Included in the Chemical Substances Inventory Under the Toxic Substances Control Act (TSCA). 1983.
Environment Canada Manual for Spills of Hazardous Materials. March, 1984.
Patty's Industrial Hygiene and Toxicology, 3rd Edition, Vol. 2B, 1981.
NIOSH. The Industrial Environment - Its Evaluation and Control. 1973.
API. Acute Toxicity Tests on Diesel Fuel. API # 79-6, 1980.
API. The Toxicology of Petroleum Hydrocarbons. May, 1982.

MATERIAL SAFETY DATA SHEET

WHMIS CLASSIFICATION

Combustible Liquid (Class B3)
Poisonous Material (Class D2)

PRODUCT CODE: N/A

DATE PREPARED: April 1, 1992

SECTION I MATERIAL IDENTIFICATION

Trade Name:	FUEL OIL
Other Names:	Furnace Oil 20X, 20, 25, 27C, 30, 40, 50, 55 Furnace Oil 0 Special, 16, 20X Special Economy Diesel
Chemical Synonyms and Family:	Petroleum hydrocarbon
Name of Manufacturer/Supplier Address & Emergency Phone Number:	Petro-Canada (403) 296-3000 P.O. Box 2844, Petro-Canada Centre Calgary, Alberta T2P 3E3
Poison Control Centre Numbers:	Consult local telephone directory for emergency numbers.
Application:	Fuel Oils are distillate fuels suitable for use in liquid fuel burning equipment without preheating.

SECTION II TRANSPORTATION

UN Number: 1202 Primary Classification: 3.3 Subsiduary Classification: 9.2

Compatibility Groups: N/A CANUTEC Transport Emergency No. (613) 996-6666

SECTION III COMPOSITION

COMPONENTS	ALLOWABLE LIMITS (8 h)	% (VOL.)	CAS #
Complex mixture of petroleum hydrocarbons.* (C_9 - C_{20})	5 mg/m^3 (oil mist)**	>99.9	68334-30-5 64742-81-0
Anti-static additive, stabilizer.	N/A	<0.1	N/A

* Aromatic content is 50% maximum (% volume). Nil benzene present.
** Petro-Canada recommendation.

NR-Not Regulated N/A-Not Applicable U-Unknown

Cette fiche est aussi disponible en français.

Trade Name: FUEL OIL

SECTION IV PHYSICAL DATA

Density: (@ 15°C)	0.87 - 0.90 kg/L	Boiling Point/Range: (@ 1 atm)	150 - 360°C (approx.)
Vapour Pressure: (@ 25°C)	1 kPa (approx.)	Percent Volatile: (@ 20°C)	U
Vapour Density: (@ 20°C)	4.5 (approx.)	Evaporation Rate:	N/A
Solubility in Water:	Insoluble		
Viscosity (Kinematic): (@ 40°C)	1.7 cSt (approx.)		
Pour Point:	-40 to -6°C (approx.)	Appearance: & Odour	Clear to yellow, bright oily liquid with hydrocarbon odour.**

** May be dyed purple or red for taxation purposes.

SECTION V FIRE & EXPLOSION DATA

Flash Point (method used= COC):	45°C (minimum)
Flammable limits in air (% by volume):	Lower 0.7% Upper 6.0%
Auto-Ignition Temperature:	>225°C
Fire and Explosion Hazards: MODERATE FIRE HAZARD	Treat as combustible liquid. Do not cut, drill or weld empty containers.
Extinguishing Media:	Dry chemical or carbon dioxide for small fires. Water spray or foam for large fires.
Fire Fighting Procedures:	Use full protective equipment and self-contained breathing apparatus. Cover with extinguishing agent. Use water spray to cool fire-exposed containers and as a protective screen. Do not point solid water stream directly into burning product to avoid spreading fire.

SECTION VI HEALTH HAZARD INFORMATION

Toxicity Data

*Estimated acute LD_{50} > 5000 mg/kg (rat, oral): practically non-toxic. Rabbit primary dermal irritation index (Draize) = 4-6.8: moderately to extremely irritating. Rabbit eye irritation index (Draize) = 0-1.3: non-irritating.

Effects of Overexposure

Inhalation: Inhalation of vapours or mist will cause headaches, nausea, dizziness, and intoxication; severe central nervous system depressant.

Skin and Eyes: Irritation, defatting and drying of skin. Prolonged exposure to skin may cause chapping, cracking or possibly dermatis. Eye contact may cause irritation, but not permanent damage.

Ingestion: Overexposure due to ingestion is unlikely for adults since taste and smell limit the amount swallowed. May be harmful or fatal if swallowed.

* Based on API Study #79-6, 83-09.

Emergency and First Aid Procedures Information

Skin: Remove contaminated clothing - launder before reuse. Soap and water wash. Discard saturated leather articles.

Eyes: Copious warm water flush - 15 minutes. Physician assessment mandatory.

Inhalation: Evacuate to fresh air. Apply Cardio Pulmonary Resuscitation if required. Administer oxygen if available. If resuscitation is required, physican assessment mandatory.

Ingestion: DO NOT INDUCE VOMITING. If vomiting - take care to prevent aspiration. Give 250 mL (1/2 pint) of milk. Mandatory physician assessment.

Notes to Physician: Gastric lavage should only be done after endotracheal intubation in view of the risk of aspiration which can cause serious chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

SECTION VII — REACTIVITY DATA

Stability: Stable under normal storage and use.

Conditions to avoid: Excessive heat, sources of ignition, formation of oil mist.

Materials to avoid: Strong oxidizing agents (strong acids, peroxides, chlorine, etc.)

Hazardous Decomposition products: CO_x, SO_x, smoke on combustion.

Can hazardous polymerization occur?: No.

SECTION VIII — SPILL OR LEAK PROCEDURES

Steps to be taken if material is released or spilled: Avoid contact. Use full protective equipment and breathing apparatus if required. ELIMINATE IGNITION SOURCES. Contain spill, absorb with inert absorbent such as dry clay, sand or diatomaceous earth, commercial sorbents, or recover using electrically grounded explosion-proof pumps. Place absorbent in closed metal containers. DO NOT FLUSH TO SEWER.

Waste Disposal Method: Incinerate at licensed waste reclaimer facility. Check with applicable jurisdictions for specific disposal requirements.

Trade Name: FUEL OIL

SECTION IX — SPECIAL PROTECTION INFORMATION

Ventilation:	General ventilation. Use explosion-proof mechanical ventilation suitable for group D atmospheres.
Respiratory Protection:	Up to 5 mg/m^3 (oil mist), none required. From 5 to 50 mg/m^3, use an approved organic vapour respirator suitable for oil mist in areas with sufficient oxygen. Above 50 mg/m^3, use full-face air-supplied or self-contained breathing apparatus.
Protective Gloves:	For direct contact with hydrocarbons of more than 2 hours, VITON or NITRILE reccomended. Otherwise, PVC gloves may be worn.
Eye Protection:	Chemical goggles if splashing likely.
Other Protective Clothing:	Long sleeved clothing to minimize skin contact.

SECTION X — SPECIAL PRECAUTIONS

Store in cool, well-ventilated area. Electrically ground/bond during pumping or transfer to avoid static accumulation. AVOID SKIN CONTACT AND INHALATION. Practice good personal hygiene. DO NOT SIPHON BY MOUTH OR USE AS A CLEANING SOLVENT. Launder work clothes frequently. Petro-Canada recommends an allowable exposure of 5 mg/m^3 (oil mist) when handling FUEL OILS.

SECTION XI — REFERENCES

ACGIH. Threshold Limit Values and Biological Exposure Indices for 1991.
CONCAWE. First Aid Measures, Medical Toxicology Data and Professional Advice to Clinicians on Petroleum Products. February 1983.
API. Petroleum Process Stream Terms Included in the Chemical Substances Inventory Under the Toxic Substances Control Act (TSCA), 1983.
Environment Canada Manual for Spills of Hazardous Materials, March, 1984.
NIOSH. The Industrial Environment - Its Evaluation and Control, 1973.
Patty's Industrial Hygiene and Toxicology, 3rd Edition, Vol. 2B, 1981.
API. The Toxicology of Petroleum Hydrocarbons, May, 1982.
API, API Studies 78-2, 78-3 and 78-4, 1979; 79-6, 1980; 83-9, 1986.

ACTION PLAN FOR GASOLINE & AVIATION FUEL SPILLS

Initial Spill

Response

- STOP the flow if possible
- ELIMINATE all possible sources of IGNITION, eg. extinguish cigarettes, shut off motors (from a remote location if surrounded by vapours)
- EVACUATE danger area
- CAREFULLY CONSIDER the hazards and merits of trying to contain the spill. Contain only if safe to do so, and obvious benefit containment is apparent, eg. contain if flowing towards a creek. Otherwise leave gasoline to spread and evaporate. Do not attempt to contain gasoline spill on water. Allow it to spread and evaporate
- VENTILATE vapours if spilled in an enclosed area.

Hazards

- highly flammable
- forms explosive mixture with air
- easily ignited by flame or spark
- moderately toxic by ingestion, highly toxic if aspirated

Action for Fire

- use carbon dioxide, dry chemical, foam or water spray (fog), although water may spread the fire
- use jet streams to wash away burning gasoline
- use fog streams to protect rescue team and trapped people
- use water to cool surface of tanks
- divert the gasoline to an open area and let it burn off under control

- if the fire is put out before all gasoline is consumed, beware of re-ignition
- where gasoline is running downhill, try to contain it at the bottom prior to reaching lakes or streams
- rubber tires are almost impossible to extinguish after involvement with a fire. have vehicles with burning tires removed from the danger area.

Recovery

- unburned gasoline can be soaked up by sand and peat moss, or by commercial sorbents such as Graboil or Conwed
- if necessary, contaminated soil should be excavated
- gasoline entering the ground can be recovered by digging sumps or trenches.

Disposal

- evaporation
- incineration under controlled conditions.

GASOLINE AND AVIATION FUEL

Properties

- chemical composition: mixture of hydrocarbons in the range of C4 to C12
- amber coloured liquids
- volatile
- not soluble, floats in water

Environmental

Threat

- moderately toxic to fish and other aquatic organisms
- may create unsightly film on water

Containers

- Gasoline and aviation fuel will be transported by tanker trucks and stored in the tank farm. Aviation fuel will be transported in steel drums and stored at the airstrip in limited quantities.

Supplier

As per annual tendering.

MATERIAL SAFETY DATA SHEET

WHMIS CLASSIFICATION

Flammable Liquid (Class B2)
Poisonous Material (Class D2)

PRODUCT CODE: N/A

DATE PREPARED: April 1, 1992

SECTION I — MATERIAL IDENTIFICATION

Trade Name:	JET B AVIATION TURBINE FUEL
Other Names:	Jet B, Jet B DI, International Jet B, International Jet B DI, Jet Fuel JP-4, Jet Fuel F-40, Turbine Fuel, Aviation, Wide Cut Type (CAN/CGSB-3.22-M).
Chemical Synonyms and Family:	Petroleum hydrocarbon
Name of Manufacturer/Supplier Address & Emergency Phone Number:	Petro-Canada (403) 296-3000 P.O. Box 2844, Petro-Canada Centre Calgary, Alberta T2P 3E3
Poison Control Centre Numbers:	Consult local telephone directory for emergency numbers.
Application:	Used as aviation turbine fuel. May contain a fuel system icing inhibitor.*

SECTION II — TRANSPORTATION

UN Number: 1863 Primary Classification: 3.1 Subsidiary Classification: NR

Compatibility Groups: N/A CANUTEC Transport Emergency No. (613) 996-6666

SECTION III — COMPOSITION

COMPONENTS	ALLOWABLE LIMITS (8 h)	% (VOL.)	CAS #
Complex mixture of aliphatic and aromatic hydrocarbons. (C_6 - C_{14})*	300 ppm (vapour)**	100	64741-41-9

* Contains trace amounts of conventional gasoline additives such as antioxidant, anti-static additive and icing inhibitor (2-methoxyethanol).
** Petro-Canada recommendation.
FLAMMABLE LIQUID

NR-Not Regulated N/A-Not Applicable U-Unknown

Cette fiche est aussi disponible en français.

Trade Name: JET B AVIATION TURBINE FUEL

SECTION IV PHYSICAL DATA

Density: (@ 15°C)	0.750-0.801 kg/L	Boiling Point/Range: (@ 1 atm)	50-250°C (approx.)
Vapour Pressure: (@ 25°C)	21 kPa (RVP max.)	Percent Volatile: (@ 20°C)	N/A
Vapour Density: (@ 20°C)	3.5 (approx.)	Evaporation Rate:	0.7 - 1.2 (n-butyl acetate = 1)
Solubility in Water:	Insoluble		
Viscosity (Kinematic): (@ 38°C)	<<7 cSt		
Freezing Point:	-51°C (max.)	Appearance: & Odour	Colourless, clear liquid with hydrocarbon odour.

SECTION V FIRE & EXPLOSION DATA

Flash Point (method used= COC): -25°C (minimum)

Flammable limits in air (% by volume): Lower 1.3% Upper 7.6%

Auto-ignition Temperature: 240°C

Fire and Explosion Hazards: Easily ignitable by flame or spark. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. Do not cut, drill or weld empty containers.

EXTEME FIRE HAZARD

Extinguishing Media: Dry chemical or carbon dioxide for small fires. Water spray or foam for large fires.

Fire Fighting Procedures: Use full protective equipment and self-contained breathing apparatus. Stop flow. Contain spill. Cover with extinguishing agent. Use water spray to cool fire-exposed containers and as a protective screen. Isolate all ignition sources in area of spill. Use gas detector in confined spaces. To avoid spreading fire do not point solid water stream directly into burning fuel.

SECTION VI HEALTH HAZARD INFORMATION

Toxicity Data: Estimated acute LD_{50} >14000 mg/kg (rat, oral): practically non-toxic

Effects of Overexposure

Inhalation: Irritation of nose and throat; headache, nausea, vomiting, dizziness, fatigue, light-headedness, reduced coordination and unconsciousness; central nervous system depressant; kidney and liver damage from long-term exposure. May be narcotic in high concentrations.

Skin and Eyes: Drying, cracking or inflammation of skin. Prolonged exposure to skin may cause dermatitis. Eye contact may cause irritation, but not permanent damage.

Ingestion: Overexposure due to ingestion is unlikely for adults since taste and smell limit the amount swallowed. Harmful or fatal if swallowed.

NOTE 1: AVOID BREATHING VAPOUR. AVOID CONTACT WITH SKIN AND EYES. AVOID ASPIRATION. NOTE 2: Jet B Aviation Turbine Fuel contains a small quantity of benzene which is a suspect human carcinogen.

Emergency and First Aid Procedures Information

Skin: Remove contaminated clothing - launder before reuse. Soap and water wash. Discard saturated leather articles.

Eyes: Copious warm water flush - 15 minutes. Physician assessment if eyes inflamed.

Inhalation: Evacuate to fresh air. Apply Cardio Pulmonary Resuscitation if required. Administer oxygen if available. If resuscitation required, physician assessment mandatory.

Ingestion: DO NOT INDUCE VOMITING. If vomiting - take care to prevent aspiration. Give 250 mL (1/2 pint) of milk to drink. Mandatory physician assessment.

Notes to Physician Gastric lavage should only be done after endotracheal intubation in view of the risk of aspiration which can cause serious chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

SECTION VII — REACTIVITY DATA

Stability:	Stable under normal storage and use.
Conditions to avoid:	Sources of ignition, heating greatly increases fire and explosion hazards.
Materials to avoid:	Strong oxidizing agents (nitric acid, sulfuric acid, chlorine, ozones, peroxides, etc.) which causes detonation on contact.
Hazardous Decomposition products:	CO_x, SO_x, partially oxidized hydrocarbons, smoke on combustion.
Can hazardous polymerization occur?:	No.

SECTION VIII — SPILL OR LEAK PROCEDURES

Steps to be taken if material is released or spilled:	Evacuate personnel. Avoid contact. Use full protective equipment and breathing apparatus. Eliminate ignition sources. Shut off source of spill. Absorb with inert absorbent such as dry clay, and or diatomaceous earth, commercial sorbents, or recover using electrically grounded explosion-proof pumps. Place absorbent in closed metal containers. DO NOT FLUSH TO SEWER. Large spills may be pumped from upwind locations using vacuum trucks and extended hoses. Large pools may be covered with foam to prevent vapour evolution. Immediate shut down and evacuation if wind shifts. Constant monitoring is required.
Waste Disposal Method:	Dispose in approved, SECURE contaminated waste landfill site or licenced waste reclaimer facility. Check with applicable jurisdictions for specific disposal requirements.

SECTION IX SPECIAL PROTECTION INFORMATION

Ventilation:	General ventilation. Use explosion-proof mechanical ventilation suitable for group D atmospheres. Local exhaust, if necessary, to control vapours to allowable limits.
Respiratory Protection:	Up to 3000 ppm, use an approved full-face organic vapour cartridge respirator. Above this level, use full-face air-supppiied or self-contained breathing apparatus.
Protective Gloves:	For direct contact with hydrocarbons of more than 2 hours, VITON or NITRILE reccomended.
Eye Protection:	Chemical goggles if splashing likely.
Other Protective Clothing:	Tyvek protective clothing to prevent all contact. DO NOT USE NATURAL RUBBER, NEOPRENE, BUTYL RUBBER OR PVC (polyvinyl choride).

SECTION X SPECIAL PRECAUTIONS

HANDLE AS EXTREMELY FLAMMABLE LIQUID. DO NOT USE AS CLEANING FLUID OR SIPHON BY MOUTH. Store in cool, well-ventilated area. Electrically ground/bond during pumping or transfer to avoid static accumulation. PRECAUTIONS SHOULD BE TAKEN TO MINIMIZE SKIN CONTACT AND INHALATION. High standards of personal hygiene are necessary. Wash skin thoroughly with soap and water after contact and before eating. Launder work clothes frequently. Petro-Canada recommends an allowable exposure of 300 ppm when handling JET B AVIATION TURBINE FUEL.

SECTION XI REFERENCES

ACGIH. Threshold Limit Values and Biological Exposure Indices for 1991.
CONCAWE. First Aid Measures, Medical Toxicology Data and Professional Advice to Clinicians on Petroleum Products. February 1983.
API. Petroleum Process Stream Terms Included in the Chemical Substances Inventory Under the Toxic Substances Control Act (TSCA), 1983.
Environment Canada Manuel for Spills of Hazardous Materials, March, 1984.
NIOSH. The Industrial Environment - Its Evalution and Control. 1973.
Patty's Industrial Hygiene and Toxicology, 3rd Edition, Vol. 2B, 1981.
API. The Toxicology of Petroleum Hydrocarbons, May, 1982.
API. API Project #1443, September 12, 1980.
API. In Vitro and In Vivo Mutagenicity Studies, Final Report, August 13, 1979.

MATERIAL SAFETY DATA SHEET

PETRO-CANADA

WHMIS CLASSIFICATION

Combustible Liquid (Class B3)
Poisonous Material (Class D2)

PRODUCT CODE: N/A

DATE PREPARED: January 1, 1993

SECTION I MATERIAL IDENTIFICATION

Trade Name: JET A/A-1 AVIATION TURBINE FUEL

Other Names: Jet A-1, A-2; Jet A-1 DI, A-2 DI, Aviation Turbine Kerosine (ATK), International Jet A-1, A-2, International A-1 DI, A-2 DI, Turbine Fuel, Aviation, Kerosine Type - (CAN/CGSB-3.23-M).

Chemical Synonyms and Family: Petroleum hydrocarbon

Name of Manufacturer/Supplier Address & Emergency Phone Number: Petro-Canada (403) 296-3000
P.O. Box 2844, Petro-Canada Centre
Calgary, Alberta T2P 3E3

Poison Control Centre Numbers: Consult local telephone directory for emergency numbers.

Application: Used as aviation turbine fuel. May contain a fuel system icing inhibitor.

SECTION II TRANSPORTATION

UN Number: 1863 Primary Classification: 3.3 Subsiduary Classification: 9.2

Compatibility Groups: N/A CANUTEC Transport Emergency No. (613) 996-6666

SECTION III COMPOSITION

COMPONENTS	ALLOWABLE LIMITS (8 h)	% (VOL.)	CAS #
Complex mixture of petroleum hydrocarbons.* (C_9 - C_{16})	5 mg/m^3 (mist)** 300 ppm (vapour)**	>99.9	8008-20-6 64742-81-0
Anti-static additive, antioxidant, metal deactivator.	N/A	0.1	N/A

* Aromatic content is 22% maximum (Benzene nil). May contain icing inhibitor (<0.2%).
** Petro-Canada recommendation.

NR-Not Regulated N/A-Not Applicable U-Unknown

Cette fiche est aussi disponible en français.

Trade Name: JET A/A-1 AVIATION TURBINE FUEL

SECTION IV PHYSICAL DATA

Density: (@ 15°C)	0.774 - 0.839 kg/L	Boiling Point/Range: (@ 1 atm)	160-300°C (approx.)
Vapour Pressure: (@ 25°C)	<0.7 kPa	Percent Volatile: (@ 20°C)	50% in 10 h (approx.)
Vapour Density: (@ 20°C)	4.5 (approx.)	Evaporation Rate:	<0.1 (n-butyl acetate = 1)
Solubility in Water:	Insoluble		
Viscosity (Kinematic): (@ -20°C)	8 cSt		
Freezing Point:	-47°C (maximum)	Appearance: & Odour	Colorless, clear liquid with hydrocarbon odour.

SECTION V FIRE & EXPLOSION DATA

Flash Point (method used= COC):	38°C (minimum)
Flammable limits in air (% by volume):	Lower 0.6% Upper 5%
Auto-ignition Temperature:	224°C
Fire and Explosion Hazards:	Treat as combustible liquid. Do not cut, drill or weld empty containers.
MODERATE FIRE HAZARD	
Extinguishing Media:	Dry chemical or carbon dioxide for small fires. Water spray or foam for large fires.
Fire Fighting Procedures:	Use full protective equipment and self-contained breathing apparatus. Cover with extinguishing agent. Use water spray to cool fire-exposed containers and as a protective screen. Do not point solid water stream directly into burning product to avoid spreading fire.

SECTION VI HEALTH HAZARD INFORMATION

Toxicity Data	*Acute LD_{50} > 15000 mg/kg (rat, oral): practically non-toxic. Rabbit dermal primary skin irritation score (Draize)= 1.96: mildly irritating. Rabbit eye irritation index (Draize) = 2.67: mildly irritating.
Effects of Overexposure	
Inhalation:	Inhalation of vapours or mist will cause headaches, nausea, dizziness and intoxication.
Skin and Eyes:	Defatting or drying of skin. Prolonged exposure to skin may cause chapping, cracking or possibly dermatitis. Vapours or mist may irritate eyes.
Ingestion:	Overexposure due to ingestion is unlikely for adults since taste and smell limit the amount swallowed. Harmful or fatal if swallowed.

*Based on API Project #1443 on Jet Fuel A which quotes oral rat LD_{50} > 25 mL/kg.

Emergency and First Aid Procedures Information

Skin: Remove contaminated clothing - launder before reuse. Soap and water wash. Discard saturated leather articles.

Eyes: Copious warm water flush - 15 minutes. Physician assessment mandatory if eyes inflamed.

Inhalation: Evacuate to fresh air. Apply Cardio Pulmonary Resuscitation if required. Administer oxygen if available. If resuscitation required, physician assessment mandatory.

Ingestion: DO NOT INDUCE VOMITING. If vomiting - take care to prevent aspiration. Give 250 mL (1/2 pint) of milk to drink. Mandatory physician assessment.

Notes to Physician: Gastric lavage should only be done after endotracheal intubation in view of the risk of aspiration which can cause serious chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

SECTION VII — REACTIVITY DATA

Stability:	Stable under normal storage and use.
Conditions to avoid:	Excessive heat, sources of ignition, formation of oil mist.
Materials to avoid:	Strong oxidizing agents (strong acids, peroxides, chlorine, etc.).
Hazardous Decomposition products:	CO_2, SO_2, smoke on combustion.
Can hazardous polymerization occur?:	No.

SECTION VIII — SPILL OR LEAK PROCEDURES

Steps to be taken if material is released or spilled:	Avoid contact. Use full protective equipment and breathing apparatus. ELIMINATE IGNITION SOURCES. Contain spill. Absorb with inert absorbent such as dry clay, sand or diatomaceous earth, commercial sorbents, or recover using electrically grounded explosion-proof pumps. Place used absorbent and rags in closed metal containers. DO NOT FLUSH TO SEWER.
Waste Disposal Method:	Dispose in approved, SECURE contaminated waste landfill site or licenced waste reclaimer facility. Check with applicable jurisdictions for specific disposal requirements.

Trade Name: JET A/A-1 AVIATION TURBINE FUEL

SECTION IX SPECIAL PROTECTION INFORMATION

Ventilation:	General ventilation. Use explosion-proof mechanical ventilation suitable for groug D atmospheres.
Respiratory Protection:	Under 5 mg/m^3, none required. From 5 to 50 mg/m^3, use an approved organic vapour respirator suitable for oil mist in areas with sufficient oxygen. Above this level, use full-face air-supplied or self-contained breathing apparatus.
Protective Gloves:	For direct contact with hydrocarbons of more than 2 hours, VITON or NITRILE reccomended.
Eye Protection:	Chemical goggles if splashing likely.
Other Protective Clothing:	Long sleeved clothing to minimize skin contact.

SECTION X SPECIAL PRECAUTIONS

Store in cool, well-ventilated area. Electrically ground/bond during pumping or transfer to avoid static accumulation. Precautions should be taken to minimize skin contact and inhalation. Practice good personal hygience. DO NOT SIPHON BY MOUTH OR USE AS A CLEANING SOLVENT. Launder work clothes frequently. Petro-Canda recommends an allowable exposure of 5 mg/m^3 (mist) when handling JET A/A-1 AVIATION TURBINE FUEL.

SECTION XI REFERENCES

ACGIH. Threshold Limit Values and Biological Exposure Indices for 1991.
CONCAWE. First Aid Measures. Medical Toxicology Data and Professional Advice to Clinicians on Petroleum Products. February 1983.
API. Petroleum Process Stream Terms Included in the Chemical Substances Inventory Under the Toxic Substances Control Act (TSCA), 1983.
Environment Canada Manuel for Spills of Hazardous Materials, March, 1984.
NIOSH. The Industrial Environment - its Evalution and Control, 1973.
Patty's Industrial Hygiene and Toxicology, 3rd Edition, Vol. 2B, 1981.
API. The Toxicology of Petroleum Hydrocarbons, May, 1982.
API. API Project #1443, September 12, 1980.
API. In Vitro and In Vivo Mutagenicity Studies, Jet Fuel A, Final Report, August 13, 1979.

Petro-Canada

Prepared by Environment, Safety and Hygiene

MATERIAL SAFETY DATA SHEET

WHMIS CLASSIFICATION

Flammable Liquid (Class B2)
Poisonous Material (Class D2)

PRODUCT CODE: N/A

DATE PREPARED: April 1, 1992

SECTION I MATERIAL IDENTIFICATION

Trade Name:	UNLEADED GASOLINE
Other Names:	Maximum Supreme , Maximum Plus and Maximum Unleaded Gasoline, Unleaded "Plus" Gasoline, Unleaded Gasoline (US Grade)
Chemical Synonyms and Family:	Petroleum hydrocarbon
Name of Manufacturer/Supplier Address & Emergency Phone Number:	Petro-Canada (403) 296-3000 P.O. Box 2844, Petro-Canada Centre Calgary, Alberta T2P 3E3
Poison Control Centre Numbers:	Consult local telephone directory for emergency numbers.
Application:	Unleaded gasoline is used as a motor vehicle fuel. Maximum Supreme, Maximum Plus and Maximum contain an advanced deposit control additive.

SECTION II TRANSPORTATION

UN Number: 1203 Primary Classification: 3.1 Subsiduary Classification: N/A

Compatibility Groups: N/A CANUTEC Transport Emergency No. (613) 996-6666

SECTION III COMPOSITION

COMPONENTS	ALLOWABLE LIMITS (8 h)	% (VOL.)	CAS #
Complex mixture of aliphatic & aromatic hydrocarbons. (C_4 - C_{12})*	300 ppm (gasoline)	100	8006-61-9

* Contains trace amounts of conventional gasoline additives such as anticoxidant, MMT (organo-manganese compound) and dye. May also contain methyl-tertiary-butyl ether (MTBE), CAS #1634-04-4, up to 11% volume and benzene from 0 - 5% volume.

FLAMMABLE LIQUID

NR-Not Regulated N/A-Not Applicable U-Unknown

Cette fiche est aussi disponible en français.

Trade Name: UNLEADED GASOLINE

SECTION IV PHYSICAL DATA

Density: (@ 15°C)	0.7 - 0.8 kg/L (approx.)	Boiling Point/Range: (@ 1 atm)	25-220°C (approx.)
Vapour Pressure: (@ 37.8°C)	56-107 kPa	Percent Volatile: (@ 20°C)	100%
Vapour Density: (@ 20°C)	3-4 (approx.)	Evaporation Rate:	4 (approx.) (n-butyl acetate = 1)
Solubility in Water:	Insoluble		
Viscosity (Kinematic): (@ 40°C)	0.6 cSt		
pH:	Max: 9.0	Appearance & Odour:	Clear, undyed liquid (Maximum); Clear green liquid (Maximum Supreme); Clear light green liquid (Maximum Plus); gasoline odour.**

**May be dyed red or purple for taxation purposes.

SECTION V FIRE & EXPLOSION DATA

Flash Point (method used= COC): - 50°C (minimum)

Flammable limits in air (% by volume): Lower 1.4% Upper 7.6%

Auto-ignition Temperature: 257°C

Fire and Explosion Hazards: Easily ignitable by flame or spark. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. Do not cut, drill or weld empty containers.

EXTREME FIRE HAZARD

Extinguishing Media: Dry chemical or carbon dioxide for small fires. Water spray or foam for large fires.

Fire Fighting Procedures: Use full protective equipment and self-contained breathing apparatus. Stop flow. Contain spill. Cover with extinguishing agent. Use water spray to cool fire-exposed containers and as a protective screen. Isolate all ignition sources in area of spill. Use gas detector in confined spaces. To avoid spreading fire do not point solid water stream directly into burning product.

SECTION VI HEALTH HAZARD INFORMATION

Toxicity Data: * Estimated acute LD_{50} = 12750 mg/kg (rat, oral): practically non-toxic. Rabbit dermal primary skin irritation score (Draize) = 0.98: slightly irritating. Rabbit eye irritation index (Draize) = 0: no irritation. IARC states that gasoline is possibly carcinogenic to humans (Group 2B).

Effects of Overexposure

Inhalation: Irritation of nose and throat; headache, nausea, vomiting, dizziness, fatigue, light-headedness, reduced coordination and unconsciousness; central nervous depressant; kidney and liver damage from long-term exposure. May be narcotic in high concentrations.

Skin and Eyes: Drying, cracking or inflammation of skin. Prolonged exposure to skin may cause dermatitis. Eye contact may cause irritation, but not permanent damage.

Ingestion: Overexposure due to ingestion is unlikely for adults since taste and smell limit the amount swallowed. May be harmful or fatal if swallowed.

NOTE 1: AVOID BREATHING VAPOUR. AVOID CONTACT WITH SKIN AND EYES. AVOID ASPIRATION. NOTE 2: GASOLINE CONTAINS A SMALL AMOUNT OF BENZENE WHICH IS A SUSPECTED HUMAN CARCINOGEN.

* Based on API Study PS-6 on Unleaded Motor Gasoline which quotes oral, rat LD_{50} = 18.75 mL/kg.

Emergency and First Aid Procedures Information

Skin:	Remove contaminated clothing - launder before reuse. Soap and water wash. Discard saturated leather articles.
Eyes:	Copious warm water flush - 15 minutes. Physician assessment if irritation persists.
Inhalation:	Evacuate to fresh air. Apply Cardio Pulmonary Resuscitation if required. Administer oxygen if available. If resuscitation is required, physician assessment mandatory.
Ingestion:	DO NOT INDUCE VOMITING. If vomiting - take care to prevent aspiration. Give 250 mL (1/2 pint) of milk. Mandatory physician assessment.
Notes to Physician	Gastric lavage should only be done after endotracheal intubation in view of the risk of aspiration which can cause serious chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

SECTION VII — REACTIVITY DATA

Stability:	Stable under normal storage and use.
Conditions to avoid:	Sources of ignition; heating greatly increases fire and explosion hazards.
Materials to avoid:	Strong oxidizing agents (nitric acid, sulfuric acid, chlorine, ozones, peroxides, etc.) which cause detonation on contact.
Hazardous Decomposition products:	CO_x, oxides of manganese, partially oxidized hydrocarbons, smoke on combustion.
Can hazardous polymerization occur?:	No.

SECTION VIII — SPILL OR LEAK PROCEDURES

Steps to be taken if material is released or spilled:	Evacuate personnel. Avoid contact. Use full protective equipment and breathing apparatus. Eliminate ignition sources. Shutoff source of spill. Absorb with inert absorbent such as dry clay, sand or diatomaceous earth, commercial sorbents, or recover using electrically grounded explosion-proof pumps. Place absorbent in closed metal containers. DO NOT FLUSH TO SEWER. Large spills may be pumped from upwind locations using vacuum trucks and extended hoses. Large pools may be covered with foam to prevent vapour evolution. Immediate shut down and evacuation if wind shifts. Constant monitoring required.
Waste Disposal Method:	Dispose in approved, SECURE contaminated waste landfill site or licenced waste reclaimer facility. Check with applicable jurisdictions for specific disposal requirements.

Trade Name: UNLEADED GASOLINE

SECTION IX SPECIAL PROTECTION INFORMATION

Ventilation:	General ventilation. Use explosion-proof mechanical ventilation suitable for group D atmospheres. Local exhaust, if necessary, to control vapours to allowable limits.
Respiratory Protection:	Between 300 ppm and 3000 ppm, use an approved full-face organic vapour cartridge respirator in areas with adequate oxygen. Above this level, use full-face air-supplied or self-contained breathing apparatus.
Protective Gloves:	For direct contact with hydrocarbons of more than 2 hours, VITON or NITRILE recommended. Otherwise PVC gloves may be worn.
Eye Protection:	Chemical goggles if splashing likely.
Other Protective Clothing:	Long sleeved clothing to minimize skin contact.

SECTION X SPECIAL PRECAUTIONS

HANDLE AS EXTREMELY FLAMMABLE LIQUID. DO NOT USE AS CLEANING FLUID OR SIPHON BY MOUTH. Store in cool, well-ventilated area. Electrically ground/bond during pumping or transfer to avoid static accumulation. PRECAUTIONS SHOULD BE TAKEN TO MINIMIZE SKIN AND EYE CONTACT AND INHALATION. High standards of personal hygiene are necessary. Wash skin thoroughly with soap and water after contact and before eating. Launder work clothes frequently. Petro-Canada recommends an allowable exposure of 300 ppm when handling UNLEADED GASOLINE.

SECTION XI REFERENCES

CONCAWE. First Aid Measures, Medical Toxicology Data and Professional Advice to Clinicians on Petroleum Products. February 1983.
ACGIH. Threshold Limit Values and Biological Exposure Indices for 1991.
API. Petroleum Process Stream Terms Included in the Chemical Substances Inventory Under the Toxic Substances Control Act (TSCA). 1983.
ITI. Toxic and Hazardous Industrial Chemicals Safety Manual. 1982.
CONCAWE. Health Aspects of Petroleum Fuels - General Principles. April. 1985.
API. Petroleum Process Stream terms included in the Chemical Substances Inventory Under the Toxic Substances Control Act (TSCA). 1983.
API. Acute Toxicity Tests. API #PS-6. Unleaded Gasoline. July 16. 1982.
IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. Volume 45. 1987.

ACTION PLAN FOR LUBRICATING & HYDRAULIC OIL SPILLS

Initial Spill

Response

- STOP the flow if possible
- ELIMINATE open flame, ignition sources
- CONTAIN flow of oil by dyking, barricading or blocking flow by any means available. Use earth moving equipment if nearby
- if flow has reached a flowing natural stream mobilize the team to deploy river boom, skimmer and sorbent booms.

Hazards

- slightly toxic by ingestion
- combustible

Action for Fire

- use carbon dioxide, dry chemical, foam or water spray (fog), although water may spread the fire
- use fog streams to protect rescue team and trapped people
- use water to cool surface of tanks
- divert the oil to an open area and let it burn off under control
- if the fire is put out before all oil is consumed, beware of re-ignition
- rubber tires are almost impossible to extinguish after involvement with a fire. Have vehicles with burning tires removed from the danger area.

Recovery

- unburned oil can be soaked up by sand and peat moss, or by chemical sorbents, such as Graboil or Conwed

- if necessary, contaminated soil should be excavated
- oil on a water surface should be recovered by skimmers and sorbent booms.

Disposal

- incineration under controlled conditions
- burial at an approved site.

Properties

- chemical composition: mixture of hydrocarbons and conventional industrial oil additives
- generally viscous liquids, various colours
- not soluble, floats on water

Environmental

Threat

- moderately toxic to fish and other aquatic organisms
- harmful to waterfowl
- may create unsightly film on water and shorelines.

Containers

- transported by tanker truck or cubes (which is a self contained unit with an eight drum capacity).

Supplier

As per annual tendering.

MATERIAL SAFETY DATA SHEET

PETRO-CANADA

WHMIS CLASSIFICATION

Not Controlled

PRODUCT CODE: 490-785, 787, 866, 779

DATE: February 15, 1991

SECTION I MATERIAL IDENTIFICATION

Trade Name:	RALUBE 40, 40CP, 1340, 1740
Other Names:	None .
Chemical Synonyms and Family:	Petroleum hydrocarbon.
Name of Manufacturer/Supplier Address & Emergency Phone Number:	Petro-Canada Inc. (403) 296-3000 P.O. Box 2844, Petro-Canada Centre Calgary, Alberta T2P 3E3
Poison Control Centre Numbers:	Consult local telephone directory for emergency numbers.
Application:	Ralube Oils are designed to lubricate the medium speed diesel engines, which power railway locomotives.

SECTION II TRANSPORTATION

UN Number: NR Primary Classification: NR Subsidiary Classification: NR

Compatibility Groups: NR CANUTEC Transport Emergency No. (613) 996-6666

SECTION III COMPOSITION

COMPONENTS	ALLOWABLE LIMITS (8 HR.)	% (VOL.)	CAS #
Severely hydrotreated hydrocarbon oil. (C_{26}-C_{66})	5 mg/m^3 (oil mist)	>85	72623-85-9 72623-83-7
Performance package, antifoam	N/A	<15	N/A

NR-Not Regulated N/A-Not Applicable U-Unknown

Cette fiche est aussi disponible en français.

Trade Name: RALUBE 40, 40CP, 1340, 1740

SECTION IV PHYSICAL DATA

Density: (@ 15°C)	0.88 kg/L	Boiling Point/Range: (@ 1 atm)	> 402°C (approx.)
Vapour Pressure: (@ 25°C)	<0.001 kPa	Percent Volatile: (@ 20°C)	0%
Vapour Density: (@ 20°C)	N/A	Evaporation Rate:	N/A
Solubility in Water:	Negligible		
Viscosity (Kinematic): (@ 40°C)	121, 142, 137, 141 cSt		
Pour Point:	-18, -12, -24, -12 °C	Appearance: & Odour	Dark amber viscous liquid with hydrocarbon odour.

SECTION V FIRE & EXPLOSION DATA

Flash Point (method used= COC):	216, 235, 250, 238 °C (minimum)
Flammable limits in air (% by volume):	N/A
Auto-ignition Temperature:	>365°C
Fire and Explosion Hazards: LOW FIRE HAZARD	Addition of water or foam may cause frothing. Do not cut, drill or weld empty containers.
Extinguishing Media:	Dry chemical or carbon dioxide for small fires. Water spray or foam for large fires.
Fire Fighting Procedures:	Contain spill. Cover with extinguishing agent. Use water spray to cool fire-exposed containers and as a protective screen. Do not point solid water stream directly into burning oil to avoid spreading. Self-contained breathing apparatus should be worn to protect against possible release of toxic chlorocarbons and oxides of sulphur if oil is burning.

SECTION VI HEALTH HAZARD INFORMATION

Toxicity Data	*Estimated acute LD_{50} >5000 mg/kg (rat, oral): practically non-toxic. Severely hydrotreated base oils are negative when tested by the modified Ames test.
Effects of Overexposure	
Inhalation:	If sprayed or misted may cause chemical pneumonitis.
Skin and Eyes:	Mildly irritating to eyes. Prolonged or repeated contact with skin may cause mild irritation and possibly dermatitis.
Ingestion:	Low toxicity on ingestion. Has laxative effect.

* Based on toxicity of paraffinic base oils and paraffinic petroleum distillates only.

Emergency and First Aid Procedures Information

Skin:	Remove contaminated clothing - launder before reuse. Soap and water wash. Discard saturated leather articles.
Eyes:	Copious warm water flush - 15 minutes. Physician assessment if eyes inflamed.
Inhalation:	Evacuate to fresh air. Apply Cardio Pulmonary Resuscitation if required. Administer oxygen if available. If resuscitation is required, physician assessment mandatory.
Ingestion:	DO NOT INDUCE VOMITING. Force fluids. Activated charcoal tablets.
Notes to Physician	Gastric lavage should only be done after endotracheal intubation in view of the risk of aspiration which can cause serious chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

SECTION VII — REACTIVITY DATA

Stability:	Stable.
Conditions to avoid:	Excessive heat, formation of oil mist.
Materials to avoid:	Strong oxidizing agents (peroxides, chlorine, strong acids, etc.).
Hazardous Decomposition products:	CO_x, SO_x, NO_x, oxides of calcium, chlorocarbons, smoke on combustion.
Can hazardous polymerization occur?:	No.

SECTION VIII — SPILL OR LEAK PROCEDURES

Steps to be taken if material is released or spilled:	Contain spill. Absorb with inert absorbent such as dry clay, sand or diatomaceous earth, commercial sorbents, or recover using pumps. Scoop up used absorbent and rags into drums.
Waste Disposal Method:	Dispose in approved, SECURE landfill site or licensed waste reclaimer facility.

Trade Name: RALUBE 40, 40CP, 1340, 1740

SECTION IX SPECIAL PROTECTION INFORMATION

Ventilation:	General ventilation.
Respiratory Protection:	Normally not necessary. If mist generated by heating, spraying, etc. wear appoved organic vapour respirator suitable for oil mist in areas with sufficient oxygen.
Protective Gloves:	For direct contact with hydrocarbons of more than two hours, VITON or NITRILE recommended. Otherwise, PVC gloves may be worn.
Eye Protection:	None normally required; chemical goggles if splashing likely or high-pressure system used.
Other Protective Clothing:	Wear long sleeved clothing to minimize skin contact.

SECTION X SPECIAL PRECAUTIONS

Store in cool, well-ventilated area. Wash hands after handling and before eating. Launder work clothes frequently. Discard saturated leather goods. Avoid inhalation and skin contact especially when handling used oil. An API study has indicated that prolonged or repeated skin exposure to used motor oils can cause skin cancer in mice.

SECTION XI REFERENCES

ACGIH. Threshold Limit Values and Biological Exposure Indices for 1989-90.
CONCAWE. First Aid Measures, Medical Toxicology Data and Professional Advice to Clinicians on Petroleum Products. February 1983.
API. Petroleum Process Stream Terms Included in the Chemical Substances Inventory Under the Toxic Substances Control Act (TSCA), 1983.
API. Acute Toxicity Tests - Paraffinic Oil, API Study 78-10, 79-4.
Petro-Canada Inc., Petro-Canada Report on Modified Ames Tests of Petroleum Basestocks, 1986.
NIOSH. The Industrial Environment - Its Evaluation and Control, 1973.
API Med. Res. Publication (1983) The Carcinogenicity of New and Used Lubricants.

Prepared by Environment, Safety and Hygiene

N/A-Not Applicable U-Unknown

MATERIAL SAFETY DATA SHEET

PETRO-CANADA

WHMIS CLASSIFICATION

Not Controlled

PRODUCT CODE: 420-001, 002, 003, 004, 005

DATE PREPARED: January 1, 1993

SECTION I MATERIAL IDENTIFICATION

Trade Name:	SUPER PLUS 10W, 20W20, 30, 40, 50
Other Names:	None
Chemical Synonyms and Family:	Petroleum hydrocarbon
Name of Manufacturer/Supplier Address & Emergency Phone Number:	Petro-Canada (403) 296-3000 P.O. Box 2844, Petro-Canada Centre Calgary, Alberta T2P 3E3
Poison Control Centre Numbers:	Consult local telephone directory for emergency numbers.
Application:	Super Plus Oils are universal crankcase lubricants, developed specifically for mixed commercial fleets. They are suitable for all types of heavy-duty diesel, gasoline, propane and natural gas engines.

SECTION II TRANSPORTATION

UN Number: NR Primary Classification: NR Subsiduary Classification: NR

Compatibility Groups: NR CANUTEC Transport Emergency No. (613) 996-6666

SECTION III COMPOSITION

COMPONENTS	ALLOWABLE LIMITS (8 h)	% (VOL.)	CAS #
Severely hydrotreated paraffinic oil and solvent refined heavy paraffinic distillate. (C_{20}-C_{66})	5 mg/m^3 (oil mist)	>88	72623-87-1 72623-85-9 64741-88-4 72623-83-7 72623-84-8 72623-86-0
Pour point depressant, silicone defoamer.	U	<1	N/A
Organo-zinc-phosphorus additive*	U	<11	N/A

*Contains zinc dialkyldithiophosphate (0.13% as Zn).

NR-Not Regulated N/A-Not Applicable U-Unknown

Cette fiche est aussi disponible en français.

Trade Name: SUPER PLUS 10W, 20W20, 30, 40, 50

SECTION IV PHYSICAL DATA

Density: (@15°C)	0.87 to 0.89 kg/l	Boiling Point/Range: (@ 1 atm)	>345°C (approx)
Vapour Pressure: (@ 25°C)	<0.01 kPa	Percent Volatile: (@ 20°C)	0%
Vapour Density: (@ 20°C)	N/A	Evaporation Rate:	N/A
Solubility in Water:	Negligible		
Viscosity (Kinematic): (@ 40°C)	35, 63, 92, 146, 224 cSt (respectively)		
Pour Point:	- 27 to -12°C	Appearance & Odour:	Light amber viscous liquid with hydrocarbon odour.

SECTION V FIRE & EXPLOSION DATA

Flash Point (method used- COC):	212°C (minimum)
Flammable limits in air (% by volume):	N/A
Auto-ignition Temperature:	> 250°C
Fire and Explosion Hazards: LOW FIRE HAZARD	Addition of water or foam may cause frothing. Do not cut, drill or weld empty containers.
Extinguishing Media:	Dry chemical or carbon dioxide for small fires. Water spray or foam for large fires.
Fire Fighting Procedures:	Contain spill. Cover with extinguishing agent. Use water spray to cool fire-exposed containers and as a protective screen. Do not point solid water stream directly into burning oil to avoid spreading.

SECTION VI HEALTH HAZARD INFORMATION

Toxicity Data	* Estimated acute LD_{50} > 5000 mg/kg (rat, oral): practically non-toxic. Severely hydrotreated base oils are negative when tested by the modified Ames test.
Effects of Overexposure	
Inhalation:	Negligible hazard at normal temperatures (up to 35°C). Elevated temperatures or mechanical action may form vapours, mists or fumes. Inhalation of oil mists or vapours from hot oil may cause irritation of the upper respiratory tract.
Skin and Eyes:	Mildly irritating to eyes. Prolonged or repeated contact with skin may cause mild irritation and possibly dermatitis.
Ingestion:	Low toxicity on ingestion. Has laxative effect.

*Based on toxicity of severely hydrotreated paraffinic oils only.

Trade Name: SUPER PLUS 10W, 20W20, 30, 40, 50

Emergency and First Aid Procedures Information

Skin:	Remove contaminated clothing - launder before reuse. Soap and water wash. Discard saturated leather articles.
Eyes:	Copious warm water flush - 15 minutes. Physician assessment if eyes inflamed.
Inhalation:	Evacuate to fresh air. Apply Cardio Pulmonary Resuscitation if required. Administer oxygen if available. If resuscitation is required, physician assessment mandatory.
Ingestion:	DO NOT INDUCE VOMITING. Force fluids. Activated charcoal tablets.
Notes to Physician	Gastric lavage should only be done after endotracheal intubation in view of the risk of aspiration which can cause serious chemical pneumonitis for which antibiotic and corticosteriod therapy may be indicated.

SECTION VII — REACTIVITY DATA

Stability:	Stable.
Conditions to avoid:	Excessive heat, formation of oil mist.
Materials to avoid:	Strong oxidizing agents (peroxides, chlorine, strong acids, etc.).
Hazardous Decomposition products:	CO_x, NO_x, SO_x, oxides of zinc, calcium and phosphorus, smoke on combustion
Can hazardous polymerization occur?:	No.

SECTION VIII — SPILL OR LEAK PROCEDURES

Steps to be taken if material is released or spilled:	Contain spill. Absorb with inert absorbent such as dry clay, sand or diatomaceous earth, commercial sorbents, or recover using pumps. Scoop up used absorbent into drums.
Waste Disposal Method:	Dispose in approved, SECURE contaminated waste landfill site or licenced waste reclaimer facility. Check with applicable jurisdictions for specific disposal requirements.

Trade Name: SUPER PLUS 10W, 20W20, 30, 40, 50

SECTION IX SPECIAL PROTECTION INFORMATION

Ventilation:	General ventilation.
Respiratory Protection:	Normally not necessary. If mist generated by heating, spraying, etc. wear approved organic vapour respirator suitable for oil mist in areas with sufficient oxygen.
Protective Gloves:	For direct contact of two hours or more, use NITRILE or VITON. Otherwise, PVC may be worn.
Eye Protection:	None normally required: chemical goggles if splashing likely or high-pressure system used.
Other Protective Clothing:	Long sleeved clothing to minimize skin contact.

SECTION X SPECIAL PRECAUTIONS

Store in cool, well-ventilated area. Wash hands after handling and before eating. Launder work clothes frequently. Discard saturated leather goods. Avoid inhalation and skin contact especially when handling used oil. An API study has indicated that prolonged or repeated skin exposure to used motor oils can cause cancer in mice. Reference: API Med. Res. Publication (1983). The Carcinogenicity of New and Used Lubricants.

SECTION XI REFERENCES

Gerarde, H. W., Toxicological Studies on Hydrocarbons. Arch Environ Health, 1963.
Gosselin, R. E., Smith, R. P. and Hodge, H. C., 'Kerosene' in Clinical Toxicology of Commercial Products. Fifth Edition. Williams & Wilkins, Baltimore, 1984.
CONCAWE, Health Aspects of Lubricants. Document 5/87, Section 4.2. October 1987.
Parson, R. D. and Wnek, C. L., Aspiration Toxicity of Ketones. Clinical Toxicology, 1980.
ACGIH, Threshold Limit Values and Biological Exposure Indices for 1991.
CONCAWE, First Aid Measures, Medical Toxicology Data and Professional Advice to Clinicians on Petroleum Products. February 1983.
API, Petroleum Process Stream Terms included in the Chemical Substances Inventory Under the Toxic Substances Control Act (TSCA), 1983.
API, Acute Toxicity Tests-Paraffinic Oil. API Study 78-9, 78-10, 79-4.
NIOSH, The Industrial Environment-its Evaluation and Control, 1973
Petro-Canada, Petro-Canada Report on Modified Ames Tests of Petroleum Basestocks, 1986.

Prepared by Environment, Safety and Hygiene

MATERIAL SAFETY DATA SHEET

WHMIS CLASSIFICATION

Not Controlled

PRODUCT CODE: 420-006, 007

DATE PREPARED: January 1, 1993

SECTION I MATERIAL IDENTIFICATION

Trade Name:	SUPER PLUS SAE 10W-30, 15W-40
Other Names:	None
Chemical Synonyms and Family:	Petroleum hydrocarbon
Name of Manufacturer/Supplier Address & Emergency Phone Number:	Petro-Canada (403) 296-3000 P.O. Box 2844, Petro-Canada Centre Calgary, Alberta T2P 3E3
Poison Control Centre Numbers:	Consult local telephone directory for emergency numbers.
Application:	Super Plus Multigrades are universal crankcase lubricants developed for mixed commercial fleets. They are suitable for diesel, gasoline, propane and compressed natural gas engines, powershift transmissions and hydraulic systems, with particular emphasis on winter operation.

SECTION II TRANSPORTATION

UN Number: NR Primary Classification: NR Subsiduary Classification: NR

Compatibility Groups: NR CANUTEC Transport Emergency No. (613) 996-6666

SECTION III COMPOSITION

COMPONENTS	ALLOWABLE LIMITS (8 h)	% (VOL.)	CAS #
Severely hydrotreated paraffinic oil. (C_{20} - C_{48})	5 mg/m^3 (oil mist)	>82	72623-87-1 72623-85-9 72623-86-0
Viscosity index improver, antifoam	N/A	< 7	N/A
Organo-zinc-phosphorous additive*	N/A	<11	N/A

* Contains zinc dialkyldithiophosphate (≤ 0.13% as Zn).

Trade Name: SUPER PLUS SAE 10W-30, 15W-40

SECTION IV PHYSICAL DATA

Density: (@ 15°C)	0.87 kg/L	Boiling Point/Range: (@ 1 atm)	>349°C
Vapour Pressure: (@ 25°C)	< 0.001 kPa	Percent Volatile: (@ 20°C)	0%
Vapour Density: (@ 20°C)	N/A	Evaporation Rate:	N/A
Solubility in Water:	Negligible		
Viscosity (Kinematic): (@ 60°C)	63. 99 cSt		
Pour Point:	-33 to - 30°C	Appearance: & Odour	Light amber viscous liquid with hydrocarbon odour.

SECTION V FIRE & EXPLOSION DATA

Flash Point (method used= COC):	205 °C (minimum)
Flammable limits in air (% by volume):	Unknown
Auto-Ignition Temperature:	>250°C
Fire and Explosion Hazards: LOW FIRE HAZARD	Addition of water or foam may cause frothing. Do not cut, drill or weld empty containers.
Extinguishing Media:	Dry chemical or carbon dioxide for small fires. Water spray or foam for large fires.
Fire Fighting Procedures:	Wear self-contained breathing apparatus with a full facepiece operated in the positive pressure demand mode when fighting fires to protect against possible release of toxic oxides if oil is burning. Contain spill. Cover with extinguishing agent. Use water spray to cool fire-exposed containers and as a protective screen. Do not point solid water stream directly into burning oil to avoid spreading.

SECTION VI HEALTH HAZARD INFORMATION

Toxicity Data	* Estimated acute LD_{50} > 5000 mg/kg (rat,oral): practically non-toxic. Severely hydrotreated base oils are negative when tested by the modified Ames test.
Effects of Overexposure	
Inhalation:	Negligible hazard at normal temperatures (up to 38°C). Elevated temperatures or mechanical action may form vapours, mists or fumes. Inhalation of oil mists or vapours from hot oil may cause irritation of the upper respiratory tract.
Skin and Eyes:	Mildly irritating to eyes. Prolonged or repeated contact with skin may cause mild irritation and possibly dermatitis.
Ingestion:	Low toxicity on ingestion. Has laxative effect.

*Based on toxicity of severely hydrotreated paraffinic oil only.

N/A-Not Applicable U-Unknown

Trade Name: SUPER PLUS SAE 10W-30, 15W-40

Emergency and First Aid Procedures Information

Skin: Remove contaminated clothing - launder before reuse. Soap and water wash. Discard saturated leather articles.

Eyes: Copious warm water flush - 15 minutes. Physician assessment if eyes inflamed.

Inhalation: Evacuate to fresh air. Apply Cardio Pulmonary Resuscitation if required. Administer oxygen if available. If resuscitation is required, physican assessment mandatory.

Ingestion: DO NOT INDUCE VOMITING. Force fluids. Activated charcoal tablets.

Notes to Physician: Gastric lavage should only be done after endotracheal intubation in view of the risk of aspiration which can cause serious chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

SECTION VII — REACTIVITY DATA

Stability: Stable.

Conditions to avoid: Excessive heat, formation of oil mist.

Materials to avoid: Strong oxidizing agents (peroxides, chlorine, strong acids, etc.).

Hazardous Decomposition products: CO_2, SO_2, NO_2, oxides of zinc, phosphorous and calcium; smoke on combustion.

Can hazardous polymerization occur?: No.

SECTION VIII — SPILL OR LEAK PROCEDURES

Steps to be taken if material is released or spilled: Contain spill. Absorb with inert absorbent such as dry clay, sand or diatomaceous earth, commercial sorbents, or recover using pumps. Scoop up used absorbent and rags into drums.

Waste Disposal Method: Dispose in approved, SECURE contaminated waste landfill site or licenced waste reclaimer facility. Check with applicable jurisdictions for specific disposal requirements.

Trade Name: SUPER PLUS SAE 10W-30, 15W-40

SECTION IX SPECIAL PROTECTION INFORMATION

Ventilation:	General ventilation.
Respiratory Protection:	Normally not necessary. If mist generated by heating, spraying, etc. wear approved organic vapour respirator suitable for oil mist in areas with sufficient oxygen.
Protective Gloves:	For direct contact with hydrocarbons of more than 2 hours. VITON or NITRILE recommended. Otherwise, PVC gloves may be worn.
Eye Protection:	None normally required: chemical goggles if splashing likely or high-pressure system used.
Other Protective Clothing:	Wear long sleeved clothing to minimize skin contact.

SECTION X SPECIAL PRECAUTIONS

Store in cool, well-ventilated area. Wash hands after handling and before eating. Launder work clothes frequently. Discard saturated leather goods. Avoid inhalation and skin contact especially when handling used oil. An API study has indicated that prolonged or repeated skin exposure to used motor oils can cause cancer in mice.

SECTION XI REFERENCES

Gerarde, H. W., Toxicological Studies on Hydrocarbons, Arch Environ Health, 1963.
Gosselin, R. E., Smith, R. P. and Hodge, H. C., 'Kerosene' In Clinical Toxicology of Commercial Products, Fifth Edition, Williams & Wilkins, Baltimore, 1984.
CONCAWE, Health Aspects of Lubricants, Document 5/87, Section 4.2, October 1987.
Parson, R. D. and Winek, C. L., Aspiration Toxicity of Ketones, Clinical Toxicology, 1980.
ACGIH, Threshold Limit Values and Biological Exposure Indices for 1991.
CONCAWE, First Aid Measures, Medical Toxicology Data and Professional Advice to Clinicians on Petroleum Products, February 1983.
API, Petroleum Process Stream Terms Included in the Chemical Substances Inventory Under the Toxic Substances Control Act (TSCA), 1983.
API, Acute Toxicity Tests - Paraffinic Oil, API Study 78-9, 78-10, 79-4.
NIOSH, The Industrial Environment - Its Evaluation and Control, 1973.
Petro-Canada, Petro-Canada Report on Modified Ames Tests of Petroleum Basestocks, 1986.
API Med. Res. Publication (1983), The Carcinogenicity of New and Used Lubricants.

ACTION PLAN FOR ETHYLENE GLYCOL ANTIFREEZE SPILL

Initial Spill

Response

- STOP the flow at source if possible
- ELIMINATE open flame ignition sources
- CONTAIN flow of liquid by dyking, barricading or blocking flow by any means available
- PREVENT antifreeze from entering any flowing streams

Hazards

- moderately toxic by ingestion and inhalation
- flammable

Action for Fire

- use carbon dioxide, dry chemical, form or water spray (fog).

Recovery

- ethylene glycol antifreeze can be soaked up by peat moss or by commercial sorbents such as Hazorb
- access to spilled or recovered ethylene glycol by mammals should be prevented

Disposal

- incineration under controlled conditions
- burial at an approved site.

Properties

- chemical composition: 96% ethylene glycol
  4% water and rust inhibitors
- clear, syrupy liquid
- soluble in water
- flammable.

Environmental

Threat

- low to moderate toxicity for fish and other aquatic organisms
- attractive smell and taste to some mammals & toxic by ingestion.

Containers

- transported and stored in steel drums or cubes (which is a self-contained unit with an 8 drum capacity).
- DOW Chemical of Canada Ltd.

VAN WATERS & ROGERS LTD. 9800 VAN HORNE WAY RICHMOND, B.C. V6X 1W5

SALES ORDER:

VAN WATERS & ROGERS PRODUCT: 77953

MSDS NUMBER: L1249 VERSION: 1

DATE PRINTED: 26/10/93

ECHO BAY MINES LTD
3300 MANULIFE PLACE
10180 - 101 STREET
EDMONTON, ALTA. T5J 3S4

WHMIS CODES: D.2A D.2B

EMERGENCY ASSISTANCE

For Emergency Assistance Involving Chemicals
Call CHEMTREC (800) 424-9300

PRODUCT INFORMATION

Product Name: UCARTHERM; CLEAR HEAT TRANSFER FLUID VW&R Code: L1249

Common Name/Synonym: PM-6195
CAS Registry Number: N/AP (mixture)
Chemical Name: ~~Ethylene glycol~~ (mixture)
Chemical Family: Ethylene glycol
Formula: N/AP (mixture)
Molecular Weight: N/AP (mixture)
Product Use: Heat transfer fluid.

PREPARATION INFORMATION

Date Issued: 01/93
Supercedes: New Issue
Prepared By: MSDS Coordinator. Contact during business hours, Eastern Time (416) 736-9299.

HAZARDOUS INGREDIENTS

Component(s)/CAS No.	% wt.	Exposure Limits, ppm OSHA PEL	ACGIH TLV
Ethylene glycol (107-21-1)	94	50* vapour	50* vapour
Potassium hydroxide (1310-58-3)	1	2 mg/m3*	2 mg/m3*
Water and processing additives (N/A)	3	N/D	N/D
Dipotassium hydrogen phosphate (7758-11-4)	2	N/D	N/D

*Ceiling

Local regulated limits may vary.

PHYSICAL PROPERTIES

Boiling Point (C at 760 mm Hg): 164.5
Melting Point: N/D
Freezing Point: -24 C
Specific Gravity (Water=1): 1.133 at 20/20 C
Vapour Pressure (at 20 C): 1.2 mmHg
Vapour Density (air = 1): 2.1
pH: N/D

Solubility in Water (% by weight): 100
Volatile: 96.27 by weight
aporation Rate (Butyl Acetate=1): 0.1
dour Threshold: N/D
Coefficient of Water/Oil Distribution: N/D
Appearance and Odour: Transparent colourless liquid; mild odour.
Physical State: Liquid.

----------FIRE AND EXPLOSION INFORMATION----------

Flash Point/Method: 126.7 C, Pensky-Martens closed cup, ASTM D 93
129.4 C, Cleveland open cup, ASTM D 92
Lower Flammable Limit, % by volume: approx. 3.2
Upper Flammable Limit, % by volume: approx. 15
Upper and lower limits for ethylene glycol.

Autoignition Temperature: N/D

Extinguishing Media: Use alcohol-type or all-purpose-type foam by manufacturers' recommended techniques for large fires. Use water spray, carbon dioxide, or dry chemical media for small fires.

Special Fire Fighting Procedures: Do not spray pool fires directly; a solid stream of water or foam directed into hot, burning liquid may cause frothing. Use self-contained breathing apparatus and protective clothing.

Unusual Fire and Explosion Hazards: None currently known.

Hazardous Combustion Products: Burning can produce carbon dioxide and/or carbon monoxide.

Explosion Data
Sensitivity to Mechanical Impact: N/D
Sensitivity to Static Discharge: N/D
Conditions of Flammability: N/D

----------HAZARDOUS REACTIVITY----------

Stability: Stable.
Hazardous Polymerization: Will not occur.
Conditions to Avoid: None currently known.

Materials to Avoid: Explosive decomposition may occur if combined with strong acids or strong bases and subjected to elevated temperatures. Therefore, avoid strong acids and strong bases at elevated temperatures. Avoid contamination with strong oxidizing agents, and materials reactive with hydroxyl compounds.

Hazardous Decomposition Products: Burning can produce carbon dioxide and/or carbon monoxide.

Conditions of Reactivity: None currently known.

----------FIRST AID MEASURES----------

If Inhaled: Remove to fresh air. Call a physician if symptoms persist.

In Case of Eye Contact: Immediately flush eyes with water for several minutes.

In Case of Skin Contact: Remove contaminated clothing and flush skin with water.

If Ingested: If conscious, give 2 glasses of water and induce vomiting. Call a physician immediately. If medical advice is delayed and the person has swallowed moderate volumes of ethylene glycol (a few ounces), then give three to four ounces of hard liquor such as whiskey.

Notes to Physician: The principal toxic effects of ethylene glycol, when ...wallowed, are kidney damage and metabolic acidosis. Ethanol is antidotal, ...d its early administration may block the formation of nephrotoxic ...etabolites of ethylene glycol in the liver. Ethanol should be given intravenously, as a 5% solution in sodium bicarbonate, at a rate of about

10 mL ethanol per hour. A desired therapeutic level of ethanol in blood is 100 mg/dL. Hemodialysis may be required. 4-Methylpyrazole, a potent inhibitor of alcohol dehydrogenase, has been used therapeutically to decrease the metabolic consequences of ethylene glycol poisoning before coma, seizure, and renal failure have occurred (20 mg/kg/day).

Pulmonary oedema with hypoxemia has been described in a number of patients following poisoning with ethylene glycol. The mechanism of production has not been elucidated, but it appears to be noncardiogenic in origin in several cases. Respiratory support with mechanical ventilation and positive end-expiratory pressure may be required. There may be cranial nerve involvement in the late stages of toxicity from swallowed ethylene glycol. In particular, effects have been reported involving the seventh, eighth, and ninth cranial nerves, presenting with bilateral facial paralysis, diminished hearing, and dysphagia.

----------HEALTH HAZARD INFORMATION----------

Primary Routes of Exposure: Inhalation, eye contact, ingestion.

Signs, Symptoms and Effects of Exposure
Inhalation: May cause irritation of the nose and throat with headache, particularly from mists. High vapour concentrations (caused, for example, by heating the material in an enclosed and poorly ventilated workplace) may produce nausea, vomiting, headache, dizziness, and irregular eye movements.

Eye Contact: Liquid, vapour, and mist may cause discomfort in the eye with persistent conjunctivitis, seen as slight excess redness of the conjunctiva. Serious corneal injury is not anticipated.

Skin Contact: No evidence of adverse effects from available information.

Skin Absorption: No evidence of adverse effects from available information.
Ingestion: May cause abdominal discomfort or pain, nausea, vomiting, dizziness, drowsiness, malaise, blurring of vision, irritability, lumbar pain, oliguria, uremia, and central nervous system effects, including irregular eye movements, convulsions, and coma. Cardiac failure and pulmonary oedema may develop. Severe kidney damage follows the swallowing of large volumes of ethylene glycol. May be fatal. A few reports have been published describing the development of weakness of the facial muscles, diminished hearing, and difficulty with swallowing during the late stages of severe poisoning.

Chronic Effects of Exposure: Effects of repeated overexposure: Inhalation of mists may produce signs of central nervous system involvement, particularly dizziness and nystagmus.

Medical Conditions Aggravated by Exposure: May aggravate existing kidney diseases.

Additional Information: N/D

----------TOXICITY DATA----------

Ethylene Glycol
LD50 Oral (rat): 4700 mg/kg, RTECS (1991)
LD50 Dermal (rabbit): 9530 mg/kg, RTECS (1991)
LC50 (species): N/D

Potassium Hydroxide
LD50 Oral (rat): 273 mg/kg, RTECS (1991)
LD50 Dermal (rabbit): N/D
LC50 (species): N/D

Water & processing additives
LD50 Oral (rat): N/D
LD50 Dermal (rabbit): N/D
LC50 (species): N/D

Dipotassium Hydrogen Phosphate
LD50 Oral (rat): N/D
LD50 Dermal (rabbit): N/D

LC50 (species): N/D

Carcinogenicity: Two chronic feeding studies, using rats and mice, have not produced any evidence that ethylene glycol causes dose-related increases in tumour incidence, or a different pattern of tumours compared with untreated controls. The absence of a carcinogenic potential for ethylene glycol has been supported by numerous in vitro genotoxicity studies showing that it does not produce mutagenic or clastogenic effects.

Sodium tolytriazole has demonstrated mutagenic activity in a bacterial test system. A correlation has been established between mutagenic activity and carcinogenic activity in many chemicals.

Sensitization: Repeated skin contact may, in a very small proportion of cases, cause sensitization with the development of allergic contact dermatitis. The incidence is significantly less than 1% with the undiluted material.

Irritancy: N/D
Reproductive Effects: N/D

Teratogenicity: Ethylene glycol has been shown to produce dose-related teratogenic effects in rats and mice when given by gavage or in drinking water at high concentrations or doses. The no-effect dose for developmental toxicity for ethylene glycol given by gavage over the period of organogenesis has been shown to be 150 mg/kg/day for the mouse and 500 mg/kg/day for the rat. Also, in a preliminary study to assess the effects of exposure of pregnant rats and mice to aerosols at concentrations 150, 1000, and 2500 mg/m3 for 6 hours a day throughout the period of organogenesis, teratogenic effects were produced at the highest concentration, but only in mice. The conditions of these latter experiments did not allow a conclusion as to whether the developmental toxicity was mediated by inhalation of aerosol, percutaneous absorption of ethylene glycol from contaminated skin, or swallowing of ethylene glycol as a result of grooming the wetted coat. In a further study, comparing effects from high aerosol concentration by whole-body or nose-only exposure, it was shown that nose-only exposure resulted in maternal toxicity (1000 and 2500 mg/m3) and developmental toxicity with minimal evidence of teratogenicity (2500 mg/m3). The no-effect concentration (based on maternal toxicity) was 500 mg/m3. In a further study in mice, no teratogenic effects could be produced when ethylene glycol was applied to the skin of pregnant mice over the period of organogenesis. The above observations suggest that ethylene glycol is to be regarded as an animal teratogen; there is currently no available information to suggest that ethylene glycol has caused birth defects in humans. Cutaneous application of ethylene glycol is ineffective in producing developmental toxicity; exposure to high aerosol concentration is only minimally effective in producing developmental toxicity; the major route for producing developmental toxicity is perorally.

Mutagenicity: Numerous in vitro genotoxicity studies have shown that ethylene glycol does not produce mutagenic or clastogenic effects. Sodium tolytriazole has demonstrated mutagenic activity in a bacterial test system.

Toxicologically Synergistic Products: N/D
Other Data: N/D
Environmental Effects: N/D

----------PREVENTATIVE MEASURES----------

Ventilation (Engineering Controls): General (mechanical) room ventilation is expected to be adequate if handled in covered equipment. Local exhaust ventilation is needed at points where vapours can be expected to escape to the workplace air.

Personal Protective Equipment
Respiratory: NIOSH or MSHA approved self-contained breathing apparatus in high vapour concentrations.
Eye: Monogoggles or face shield.
Clothing: N/D
Footwear: N/D
Hands: Natural rubber, nitrile, neoprene, or PVC gloves.

Other Protective Measures: Eye bath and safety shower.

tion to Take for Spills or Leaks: Wear suitable protective equipment. mall spills can be flushed with large amounts of water. Larger spills should be collected for disposal.

Waste Disposal Method: Incinerate in a furnace where permitted under appropriate federal, provincial, and local regulations. At very low concentrations in water, ethylene glycol is readily biodegradable in a biological wastewater treatment plant.

Storage and Handling Precautions and Equipment: DANGER! Harmful or fatal if swallowed. Causes eye irritation. Prolonged or repeated breathing of mist or vapour is harmful. May cause kidney and nervous system damage. Ethylene glycol causes birth defects in laboratory animals.

Do not swallow. Avoid contact with eyes. Do not breathe mist from spray. Avoid prolonged or repeated breathing of vapour. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

Special Shipping Information: N/D

Other Precautions: The maximum recommended skin temperature on the heat transfer fluid side of a heat exchanger is 160C. If the fluid is exposed to excessively high temperatures, thermal degradation can occur; organic acids and other irritating fumes could result. Respiratory protection, such as an air-supplied mask, may be needed until the fumes can be removed.

Undyed, this heat transfer fluid is not suitable for use in any system where contamination of drinking water supply is possible.

WARNING: Sudden release of hot organic chemical vapours or mists from process equipment operating at elevated temperature and pressure, or sudden ingress of air into vacuum equipment, may result in ignitions without the presence of obvious ignition sources. Published "autoignition" or nition" temperature values cannot be treated as safe operating mperatures in chemical processes without analysis of the actual process onditions.

Any use of this product in elevated-temperature processes should be thoroughly evaluated to establish and maintain safe operating conditions. Further information is available in a technical bulletin entitled "Ignition Hazards of Organic Chemical Vapours."

FOR INDUSTRIAL USE ONLY

----------REGULATORY INFORMATION----------

TDG Classification

Shipping Name: Non-Regulated
UN: N/R
Class:
PKG:

WHMIS Classification: D.2A; D.2B

Listed on the Domestic Substances List (DSL): Yes

----------FOR PRODUCT AND SALES INFORMATION----------

Contact Your Local Van Waters & Rogers Ltd. Branch Office.

----------NOTICE----------

VAN WATERS & ROGERS LTD. EXPRESSLY DISCLAIMS ALL EXPRESSED OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE PRODUCT PROVIDED.

----------REVISION INFORMATION----------

Legend: N/AP - Not Applicable. N/D - No Data Available.

========== END OF MSDS ==========

ACTION PLAN FOR SODIUM CYANIDE SPILLS

Initial Spill

Response

- Test prills for gas
- TEST for presence of hydrocyanic acid (HCN) gas
- DO NOT ENTER area containing sodium cyanide dust or HCN gas without self-contained breathing apparatus
- STOP spill at source if possible
- PREVENT solid sodium cyanide from contracting acid, acid salts, or water
- if sodium cyanide does contact water, CONTAIN solution to as small an area as possible. Consider dyking
- if HCN gas is being produced, WEAR PROTECTIVE CLOTHING AND BREATHING APPARATUS, VENTILATE AND ADD HYDRATED LIME to slow the reaction
- ISOLATE area of spill, preferably by roping off affected area and posting appropriate hazard signs.

Hazards

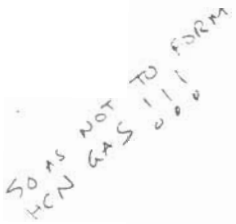
- extremely toxic by ingestion or inhalation (of dust or gas)
- corrosive to skin, due to strong alkalinity
- liberates highly toxic HCN gas if sodium cyanide comes in contact with any acid or acid salts
- contact with carbon dioxide produces HCN gas in lesser, but possibly dangerous quantities
- contact with water may produce small amounts of HCN gas
- HCN gas can be absorbed though the skin.

Action for Fire

- sodium cyanide is not flammable and will not support combustion, however, HCN gas is flammable
- **DO NOT USE CARBON DIOXIDE** extinguishers to fight a fire involving sodium cyanide, as this may produce toxic and flammable HCN gas
- if water is used to fight a fire involving sodium cyanide, treat run-off as though it was a spill of sodium cyanide solution. Do not allow run-off to reach a stream.

Recovery

- spills of sodium cyanide on dry surfaces can be shovelled into containers. Crews should wear dust masks while shovelling or sweeping up spills. Beware of contacting the skin with solid NaCN because it can be absorbed through the skin
- spills of solid sodium cyanide on wet surfaces or exposed to rain should be shovelled into waterproof containers as soon as possible to minimize the quantity of sodium cyanide being dissolved. Affected area should be sprayed with solution of calcium hypochlorite to neutralize cyanide into an HCN gas as this gas is highly toxic. Personnel so employed shall be required to utilize a self-contained breathing apparatus



- sodium cyanide, as a solid or in solution, must not be allowed access to any flowing stream, as its recovery from such a stream is virtually impossible.
- soil contaminated with sodium cyanide should be excavated if the affected ground water threatens to travel to an adjacent flowing stream
- solutions of sodium cyanide which are not recovered can be neutralized by addition of lime and calcium hypochlorite
- sorbents may be used to contain and recover spilled solutions.

Disposal

- solid sodium cyanide recovered from a spill may be used in the mill if it is of acceptable quality
- solid sodium cyanide, all sodium cyanide solutions recovered from the spills, and soil containing sodium cyanide should be added to the mill circuits under the direction of the Mill Superintendent, or disposed of in the tailings pond.

Properties

- chemical formula NaCN
- white solid (briquettes)
- very soluble in water
- aqueous solution is strongly alkaline and decomposes rapidly
- solid sodium cyanide absorbs moisture from the air, and tends toward a liquid state.

Environmental

Threat

- very toxic to fish and other forms of aquatic life at concentrations considerably less than 1 mg/1.

Containers

- transported an stored in 100 kg. steel drums and 1360 kg. Flo-Bins.

Supplier

- Dupont

Cyanide Antidote

Keep the following solutions, obtainable from any pharmacist, ready for use:

a. 158 grams B.P. ferrous sulphate crystals (FeSO47H20) and 3 grams of B.P. citric acid dissolved in 1 litre of water.

b. 60 grams anhydrous sodium carbonate (Na2CO3) dissolved in 1 liter of distilled water.

DOSE: Mix equal quantities of a and b to make approximately 250 ml (8 oz.) glassful and swallow the mixture. The above solutions will keep indefinitely provided the ferrous sulphate is stored away from direct sunlight.

Health Hazards

1. Sodium Cyanide spills should be cleaned up promptly to minimize exposure to people and the environment. Shovel and/or sweep up spilled material into a drum or other suitable covered container;
2. Owing to the toxicity of Sodium Cyanide, it is important that all persons coming in contact with it be completely familiar with and observe established safety procedures;
3. Sodium Cyanide is a rapidly fatal poison when taken internally. Poisoning may occur if sodium cyanide dust is inhaled. Prolonged contact with the skin may cause irritation and possibly poisoning, particularly if there are open wounds or skin abrasions. Sodium Cyanide causes eye burns;
4. Sodium Cyanide in contact with acids or weak alkalies liberates highly toxic and flammable hydrocyanic Acid (HCN) gas. Also, toxic amounts of HCN can be liberated from water solutions of Sodium Cyanide;
5. Take every precaution to keep acids or weak alkalies from contacting Sodium Cyanide. **DO NOT STORE WITH ACIDS OR WEAK ALKALIES;**

6. NEVER STORE, HANDLE, OR CONSUME FOOD OR BEVERAGES IN AREAS WHERE SODIUM CYANIDE IS BEING USED, HANDLED OR STORED;
7. When being stored keep the Sodium Cyanide dry. Keep containers closed. Store the sodium Cyanide in a dry, well ventilated area. Keep away from oxidizing agents.

Safety Precautions

1. All personnel responding to a spill clean up are to be properly attired (rubber suit - rubber gloves - rubber boots - dust mask - respirator/air pack - sleeves and cuffs taped so no cyanide dust will come in contact with the skin). The accident/incident and location will indicate attire required. Use common sense when responding to petroleum/toxic spills;
2. Do not breath dust or gas. Wear an approved dust respirator when there is danger of inhaling cyanide dust or use an approved air pack;
3. Avoid contact of cyanide with the skin. Do not allow contact with open wounds or skin abrasions;
4. Do not get cyanide dust in eyes. Wear approved chemical splash goggles when handling cyanide solutions and where there is danger of splashing.
5. Immediately sweep onto a shovel any spilled cyanide and place in a suitable closeable container. Dry spills occurring outside - excavate solid and dispose of it in the tailings pond.
6. Wash all outer clothing thoroughly upon completion of clean-up and shower vigorously.
7. Remain upwind at all times when conducting clean-up operations involving sodium cyanide spills.

Symptoms of Cyanide Poisoning

Personnel should be constantly alert and prepared to take immediate action in case of exposure to cyanide. The following symptoms of cyanide poisoning are easily recognized:

a. Reddening of the eyes
b. Irritations of the throat
c. Palpitation
d. Difficulty in breathing
e. Salivation
f. Nausea
g. Headache
h. Weakness of arms and legs
i. Giddiness
j. Collapse and convulsions
k. Numbness
l. Death

Effects of Exposure to HCN Vapour

Toxicity data:
300 PPM - Rapidly fatal
100 - 240 PPM - Fatal within 1/2 to 1 hour
45 - 54 PPM - Tolerated 1/2 to 1 hour without immediate or delayed effect
20 - 40 PPM - Slight symptoms after several hours
10 PPM - Threshold limit/Time-weighted average for normal 8 hour day
2 - 5 PPM - Odour threshold

In case of overexposure to HCN, quick action is called for in removing the victim from the contaminated area and administering first aid and medical treatment. While cyanide poisoning is rapidly fatal, no case should be considered hopeless as long as there is a heartbeat (only a physician can certify death).

First Aid Treatment when Administering AMYL Nitrite

* WARNING: Any person giving first aid should be careful to keep the broken pearls away from his own mouth and nose; otherwise he may inhale sufficient amyl nitrite to become dizzy and be incompetent to give proper assistance. Since amyl nitrite is flammable, be careful to remove all sources of ignition, such as open flames or cigarettes, before breaking the pearls.

1. <u>If patient is conscious and breathing:</u>
   Break the amyl nitrite pearl in a cloth and hold lightly under the patient's nose for 15 seconds, repeating five times at about 15 second intervals. If necessary, repeat this procedure every five minutes with fresh pearls until three or four pearls have been given.
2. <u>If patient is unconscious but breathing:</u>
   Break the amyl nitrite pearl in a cloth and hold lightly under the patient's nose for 15 seconds, repeating five times at about 15 second intervals. If necessary, repeat this procedure every five minutes with fresh pearls until three or four pearls have been given. If recovery is not forthcoming, give oxygen from an inhalator.
3. <u>If patient has stopped breathing:</u>
   Give artificial respiration until breathing starts. Also, Break the amyl nitrite pearl in a cloth and hold lightly under the patient's nose for 15 seconds, repeating five times at about 15 second intervals. If necessary, repeat this procedure every five minutes with fresh pearls until three or four pearls have been given.
4. <u>Inhalation of Cyanide:</u>
   If inhaled, carry patient to fresh air. Have patient lie down. Administer antidote (as in 1, 2, or 3. above) and remove contaminated clothing. Keep patient quiet and warm until physician/nurse arrives.

5. Ingestion of Cyanide:

If cyanide has been swallowed, administer antidote (as in 1, 2, or 3, above) give patient one pint of 1% sodium thiosulphate solution (or soapy or mustard water) by mouth and induce vomiting. Repeat until vomit fluid is clear. Never give anything by mouth to an unconscious person.

6. Skin or Eye Contact:

In case of contact of sodium cyanide with skin or eyes immediately flush with plenty or water for at least 15 minutes.

Medical Treatment - By Physician/Registered Nurse ONLY

1. Treatment of Cyanide Poisoning:

Have someone break an amyl nitrite pearl in a cloth and hold it tightly under the patient's nose for 15 seconds, repeating five times at about 15 second intervals while preparations for the sodium nitrite and sodium thiosulphate injections are made.

Discontinue administration of amyl nitrite and inject the solution of sodium nitrite (10 ml of a 3% solution) intravenously at the rate of 2.5 ML/minute, then immediately inject the sodium thiosulphate (50ML of a 25% solution) at the same rate, taking care to avoid extravasation.

Watch patient continuously for 24 - 48 hours. If there is any return of symptoms during this period, repeat the treatment, but use one half the amounts of sodium nitrite and sodium thiosulphate solutions.

If signs of excessive methaemoglobinaemia develop (ie. blue skin and mucous membranes, vomiting, shock and coma), 1% methylene blue solution should be given intravenously. A total dose of one to two mg/kg of body weight should be administered over a period of five to ten minutes and should be repeated in one hour if necessary. In addition, oxygen inhalation will be helpful and a transfusion of whole fresh blood may be considered if there has been mechanical injury with bleeding or internal blood loss simultaneously with the cyanide exposure.

NOTE: A second injection of the antidotes on one half the dosage initially used can be administered two hours after the initial treatment to help the patient ward off a relapse.

2. Treatment of Cyanide Sores

In case any sore or irritation of the skin develops coincidentally with handling cyanide or its solutions, consult a physician or dermatologist. (At Lupin contact the Nurse).

3. Treatment of Burns

Burns from molten cyanide mixtures are the same as those from alkalies and should be treated in a similar manner. Wash the burns thoroughly with warm water to remove all cyanide and alkalies present, then treat as any burn and consult a physician. (At Lupin contact the Nurse).

DUPONT CANADA INC.

MATERIAL SAFETY DATA SHEET

MATERIAL IDENTIFICATION **Sodium Cyanide**

MSDS NUMBER : CEC00007
CORPORATE NUMBER : DU000290

"CYANOBRIK", "CYANOGRAN", "CYANO-DOL" are registered trademarks of Du Pont.

Revision Date : 06-Oct-93
Date Printed : 12-Oct-93

MANUFACTURER/DISTRIBUTOR
Du Pont Canada Inc.
P.O. Box 2200
Mississauga
Ontario
L5M 2H3

PHONE NUMBERS
PRODUCT INFORMATION : 1-(800)387-2122
TRANSPORT EMERGENCY : 1-(613)348-3616
MEDICAL EMERGENCY : 1-(613)348-3616

GRADE : "CYANOBRIK"; "CYANOGRAN"; "CYANO-DOL"; COMPOUNDERS GRADE
CHEMICAL FAMILY : ALKALI METAL CYANIDE

TRADE NAMES / SYNONYMS
Cyanide of Sodium
Prussiate of Soda

CAS NAME : SODIUM CYANIDE
CAS NUMBER : 143-33-9
FORMULA : NaCN
TSCA INVENTORY STATUS : Reported/Included
NFPA RATINGS : Health: 3 Flammability: 0 Reactivity: 1
NPCA-HMIS RATINGS : Health: 3 Flammability: 0 Reactivity: 1
Personal Protection rating to be supplied by user depending on use conditions.

WHMIS CLASSIFICATION
CLASS D Division 1 Subdivision A : Very Toxic Material/Acute Lethality
CLASS D Division 2 Subdivision B : Toxic Material. Skin or Eye Irritant.

COMPONENTS

Material	CAS Number	%
Sodium Cyanide	143-33-9	100

DSL: REPORTED/ INCLUDED

PHYSICAL DATA

Boiling Point	: 1,496 deg C (2,725 deg F) at 760 mm Hg.
Vapor Pressure	: Negligible
Vapor Density	: Not volatile
Melting Point	: 564 deg C (1,047 deg F)
Water Solubility	: 37 WT % at 20 deg C (68 deg F)
pH	: 11.3-11.7 Typical for 5-25% solutions-no pH adjustment
Form	: Solid, granular or briquettes
Color	: White
Specific Gravity	: 1.6
Odor	: None (but can have slight ammonia and/or hydrogen cyanide odor if damp).

HAZARDOUS REACTIVITY

Instability	: Very stable when dry.
Decomposition	: Moisture will cause slow decomposition, releasing poisonous hydrogen cyanide and ammonia gases.
Polymerization	: Polymerization will not occur.
Incompatibility	: Large amounts of poisonous, flammable hydrogen cyanide (HCN) gas will be evolved from contact with acids. Reacts violently with strong oxidizing agents. Water or weak alkaline solution can produce dangerous amounts of hydrogen cyanide in confined areas.

FIRE AND EXPLOSION DATA

Will not burn.

FIRE AND EXPLOSION HAZARDS

Will not burn. Sodium cyanide will not be destroyed in an ordinary fire involving combustible materials such as paper or wood. Follow appropriate National Fire Protection Association (NFPA) codes.

(FIRE AND EXPLOSION DATA - Continued)

EXTINGUISHING MEDIA

Use water on fires near sodium cyanide but minimize amount of water if containers are opened or burned (see "Incompatibility" above). Also, judgement should be used in light of runoff problems (see "Special Fire Fighting Instructions" below). In some cases it may be desirable to let a fire burn out by itself. DO NOT use carbon dioxide (CO2) which reacts with sodium cyanide to produce hydrogen cyanide if moisture is present.

SPECIAL FIRE FIGHTING INSTRUCTIONS

Sodium cyanide dissolves readily in water; therefore, cyanide solution runoff may occur if containers are opened or burned. Runoff should be contained to avoid environmental or safety problems. Contained cyanide solution can be detoxified with hypochlorite.

HEALTH HAZARD INFORMATION

May be fatal if inhaled, swallowed, or absorbed through skin. Contact with acids or weak alkalies liberates poisonous gas. Causes eye burns and may irritate skin.

ANIMAL DATA:

Oral LD50: 15 mg/kg in rats

The compound is a skin and eye irritant in tests with laboratory animals. Toxic effects described in animals from exposure by inhalation, ingestion, or skin contact include asphyxia (lack of oxygen), dyspnea (shortness of breath), ataxia (incoordination), tremors, coma, and lethality by disrupting oxidative metabolism. Tests in bacterial and mammalian cell cultures demonstrate no mutagenic activity. Tests for embryotoxicity in animals have shown an embryotoxic or teratogenic effect only at exposure levels very nearly lethal to the maternal animals. Observance of the established exposure limits and prevention of skin contact with sodium cyanide solutions should be adequate to prevent adverse health effects on anyone in the workplace, including the conceptus (fetus).

HUMAN HEALTH EFFECTS:

Overexposure by skin contact may include skin irritation with discomfort and rash. Eye contact may include irritation or burns with discomfort, tearing or blurring of vision. Excessive and prolonged contact may result in permanent eye damage.

Effects of skin contact, inhalation or ingestion overexposures to cyanide are characterized by central

(HEALTH HAZARD INFORMATION - Continued)

nervous system excitation followed by depression. Symptoms may include:

Reddening of the eyes	Nausea
Irritation of the throat	Headache
Palpitation	Weakness of arms and legs
Difficulty in breathing	Giddiness
Salivation	Collapse
Numbness	Convulsions

Convulsions, coma and death due to respiratory arrest may occur without first aid or medical treatment.

Cyanosis (bluish discoloration of the skin) is a sign that follows cardiovascular collapse and apnea (absence of breathing). Reported chronic effects of acute, severe overexposures may not be due to cyanide per se but to the hypoxic (oxygen deficient) state. There appears to be no cumulative effects from repeated exposures. Reports of chronic thyroid effects from occupational exposure to cyanide fail to establish a well defined cause-effect relationship.

Individuals with preexisting diseases of the central nervous system may have increased susceptibility to the toxicity of excessive exposures.

CARCINOGENICITY

None of the components in this material is listed by IARC, NTP, OSHA, or ACGIH as a carcinogen.

EXPOSURE LIMITS

Sodium Cyanide

AEL * (Du Pont): None Established
TLV (ACGIH) : 5 mg/m3, as CN - 8 Hr TWA, skin
PEL (OSHA) : 5 mg/m3, as CN - 8 Hr TWA, skin

* AEL is Du Pont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

SAFETY PRECAUTIONS

Emergency pre-planning and training are needed before beginning to work with sodium cyanide since prompt treatment is essential in cases of cyanide poisoning. Always have Cyanide Antidote Kits on hand.

Do not breathe dust, mist, or hydrogen cyanide gas. Do not get in eyes. Avoid contact with skin and clothing. Do not carry foodstuffs, beverages, or tobacco where contamination with cyanide is possible. Wash thoroughly after handling. Wash contaminated clothing before reuse.

FIRST AID

FIRST AID AND MEDICAL TREATMENT

Treatment for cyanide poisoning can be provided in two ways, "First Aid" and "Medical Treatment". Both require immediate action to prevent further harm or death. First aid using oxygen and amyl nitrite can be given by a layperson before trained medical help arrives. Medical treatment may require intravenous injections of sodium nitrite and sodium thiosulfate, and must be administered by qualified medical personnel. Even if a doctor or nurse is present, the need for fast treatment dictates using first aid treatment with oxygen and amyl nitrite while medical treatment materials for intravenous injection are being prepared. Experience shows that first aid given promptly is usually the only treatment needed for typical accidental poisonings. Larger cyanide exposure increases the need for medical treatment.

Medical treatment with standard intravenous doses of sodium nitrite followed by sodium thiosulfate is reserved for patients who do not regain clear consciousness with oxygen and amyl nitrite. However, even under optimum conditions, amyl nitrite can be administered faster and should be used even if medical treatment follows.

Any site where cyanide is handled should always stock the materials listed for First Aid supplies and Medical Treatment Kits. Identification of community hospital resources and emergency medical squads in order to equip and train them prior to an exposure is essential. All employees who will work with cyanide must be trained, and routinely practice rescue and first aid actions for cyanide exposures.

In case of cyanide poisoning, start first aid treatment immediately, then call a physician.

FIRST AID SUPPLIES

Adequate first aid supplies for cyanide poisoning should be conveniently placed throughout cyanide areas and should be immediately accessible at all times. They should be routinely inspected (typically daily) by people who would use them in an emergency. The total number of each item listed below should be adequate to handle the largest number of exposure cases reasonably anticipated, taking into account that some supplies may be wasted, destroyed, or inaccessible in the emergency.

1. Oxygen Resuscitators - The Flynn Series III Model by O-Two Systems (800-387-3405) has performed well in DuPont use. It is lightweight, rugged, and easy to use.

2. Amyl Nitrite Ampules (antidote) - One box of one dozen

(FIRST AID - Continued)

ampules per station is usually satisfactory. Locate stations throughout the cyanide area.

CAUTION: Amyl nitrite is not stable and must be replaced every 1 to 2 years. Store in the original dated box, away from heat. A common DuPont practice is to use the resuscitator as the storage point for the amyl nitrite ampules. Avoid storage on vehicles where temperatures can reach 60-66 deg C (140-150 deg F) or more. Storage in high temperature climates may require replacement before the expiration date. Also, excessive cold storage may limit the vapor pressure of amyl nitrite and may reduce its evaporating property. Kits and amyl nitrite should be accessible, but secured against tampering or theft.

**FIRST AID INFORMATION CONTINUED IN NOTES TO PHYSICIAN

NOTES TO PHYSICIAN

**INFORMATION CONTINUED FROM FIRST AID SECTION

3. A set of cyanide first aid instructions should be located at each amyl nitrite storage location. Workers should be fully trained since in a real emergency there will be insufficient time to "read the book".

MEDICAL TREATMENT KITS

Medical Treatment Kits for cyanide poisoning should be conveniently located for easy access by medical people. Materials for intravenous injection are intended for use only by a physician or fully qualified medical personnel. The location of kits should be carefully planned as part of the emergency preplan. Suggested locations for kits include:

- in or near the cyanide area
- plant medical station
- entrance guard house
- local hospital
- doctor's office and residence

Medical Treatment Kits should contain the following:

1. One box containing one dozen (12) amyl nitrite ampules.

2. Two sterile ampules of sodium nitrite solution (10 mL of a 3% solution in each).

3. Two sterile ampules of sodium thiosulfate solution (50 mL of a 25% solution in each).

4. One 10 mL sterile syringe. One 50 mL sterile syringe. Two sterile intravenous needles. One tourniquet.

(FIRST AID - Continued)

5. One dozen gauze pads.

6. Latex gloves.

7. A "Biohazard" bag for disposal of bloody/contaminated equipment.

8. A set of cyanide instructions on first aid and medical treatment.

NOTE: Amyl Nitrite Ampules and "Medical Treatment Kits" can be purchased through local pharmacies with a physician's prescription. The pharmacy can order kits by calling the Lilly Wholesaler at:

Eastern Region	1-203-741-0761
Midwestern Region	1-317-276-3377
Western Region	1-209-443-2626

Amyl Nitrite Notes:

1. Amyl nitrite is highly volatile and flammable; do not smoke or use around a source of ignition.

2. If treating patient in a windy or drafty area, provide something--a rag, shirt, wall, drum, cupped hand, etc.-- to prevent the amyl nitrite vapors from being blown away. Keep the ampule upwind from the nose. The objective is to get amyl nitrite into the patient's lungs.

3. Rescuers should avoid amyl nitrite inhalation to avoid becoming dizzy and losing competence.

4. Lay the patient down. Since amyl nitrite dilates blood vessels and lowers blood pressure, lying down will help prevent unconsciousness.

5. Do not overuse; excessive use might put the patient in shock. This has not occurred in practice at DuPont plants, and we are not aware of any death or serious aftereffects from treatment with amyl nitrite. (See MEDICAL TREATMENT section.)

FIRST AID

1. If no symptoms, no treatment is necessary; decontaminate patient.

2. If conscious but symptoms (nausea, shortness of breath, dizziness) are evident, give oxygen.

3. If consciousness is impaired (slurred speech, drowsiness), give oxygen and amyl nitrite.

(FIRST AID - Continued)

4. If unconscious but breathing, give oxygen and amyl nitrite by means of a respirator.

***INFORMATION CONTINUED IN ADDITIONAL INFORMATION AND REFERENCES SECTION.

PROTECTION INFORMATION

GENERALLY APPLICABLE CONTROL MEASURES AND PRECAUTIONS

Good general ventilation should be provided to keep dust, mist, and hydrogen cyanide gas below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Recommended minimum protection: chemical splash goggles and rubber gloves (butyl or neoprene preferred).

Have available and use as appropriate: face shield; rubber suits, aprons, and boots; disposable toxic dust and mist respirators; self-contained breathing air supply (in case of emergency); hydrogen cyanide detector; first aid and medical treatment supplies, including oxygen resuscitators.

DISPOSAL INFORMATION

AQUATIC TOXICITY

96-hour LC50 values range from 0.05-1.7 mg/L (several species). Cyanide appears to be more toxic to aquatic life than terrestrial life.

SPILL, LEAK, OR RELEASE

NOTE: Review FIRE AND EXPLOSION HAZARDS and SAFETY PRECAUTIONS before proceeding with clean up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean up.

Sweep up and shovel into a covered container or plastic bag, pending transfer, to secure the spill. Cover and keep spillage dry. Flush spill area with a dilute solution of sodium hypochlorite or calcium hypochlorite to destroy the cyanide. Comply with Federal, State, and local regulations on reporting releases. The EPA Reportable Quantity is 10 lbs.

WASTE DISPOSAL

This material may be an RCRA Hazardous Waste (P-106). Do not flush cyanide into sewers which may contain an acid. Detoxify with dilute sodium hypochlorite, hydrogen peroxide, or calcium hypochlorite. Comply with Federal, State, and local regulations on disposal methods used to achieve the constituent based treatment standard, if permitted; or transfer to a licensed disposal contractor.

SHIPPING INFORMATION

TDG
- Proper Shipping Name : SODIUM CYANIDE, SOLID
- Pin No. : UN 1689
- TDG Class : 6.1 (9.2)
- TDG Packaging Group: I

DOT
- Proper Shipping Name : SODIUM CYANIDE
- Hazard Class : 6.1
- UN/NA No. : UN 1689
- DOT Labels(s) : POISON
- Special Information: MARINE POLLUTANT

DOT/IMO
- Proper Shipping Name : SODIUM CYANIDE, SOLID
- Hazard Class : 6.1
- UN No. : 1689
- DOT/IMO Label : POISON
- Special Information: MARINE POLLUTANT
- Packaging Group : I

Reportable Quantity : 10 lbs.

Shipping Containers
"CYANO-DOL" railcars and trucks; hopper rail-cars; "Flo-Bins" (30001b net); 2001b bag in a box: 100 kilo, 100 lb, & 2001b steel drums. Reportable Quantity: 10 lb/4.54 kg

STORAGE CONDITIONS

Store in properly labeled containers in dry, ventilated, secured areas. Keep containers closed and contents dry. Do not store with acids or acid salts, containers with water or weak alkalis, or oxidizing agents. Do not handle or store food, beverages, or tobacco in cyanide areas. Do not store near combustibles or flammables because of cyanide solution run-off from water used for fire fighting.

TITLE III HAZARD CLASSIFICATIONS

- Acute : Yes
- Chronic : No
- Fire : No
- Reactivity : Yes
- Pressure : No

(TITLE III HAZARD CLASSIFICATIONS - Continued)

Lists:

Extremely Hazardous Substance	-	Yes
CERCLA Hazardous Substance	-	Yes
Toxic Chemical	-	Yes

ADDITIONAL INFORMATION AND REFERENCES

INFORMATION CONTINUED FROM OTHER EXPOSURE LIMITS

The "Skin" notation indicates that cyanide may penetrate the skin (especially if the skin is broken). Control of vapor, dust, and mist inhalation alone may not be sufficient to prevent an excessive dose.

INFORMATION CONTINUED FROM NOTES TO PHYSICIAN SECTION

5. If not breathing, give oxygan and amyl nitrite by means of a positive pressure respirator. To give amyl nitrite, break an ampule in a cloth and insert into lip of mask for 15 seconds, then take away for 15 seconds. Repeat 5-6 times. If necessary, use a fresh ampule every 3 minutes until the patient regains consciousness (usually 1-4 ampules). Continue to give oxygen simultaneously to aid recovery. If massive exposure occurred, consider keeping the first one or two ampules in the lip of the mask continuously.

The exposed person should be removed from the contaminated area, contaminated clothing removed and the individual washed off. The rescuer and/or person providing first aid is subject to exposure if the affected person's clothing is wetted with cyanide. Rescue and contact with a wetted person should be done by rescuers wearing self-contained breathing air (SCBA) and other personal protective equipment. For sodium cyanide solution, SCBA is normally not needed. Contact with hydrogen cyanide must be avoided by rescuers, but short contact with solid cyanides or solutions is normally not a problem if skin washing is prompt. As soon as possible, even while clothing is being removed or washing is taking place, first aid should be started.

INHALATION

If consciousness is impaired, oxygen and amyl nitrite should be administered.

Carry the patient to an uncontaminated atmosphere. Keep the patient warm and calm.

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(ADDITIONAL INFORMATION AND REFERENCES - Continued)

SKIN CONTACT

If consciousness is impaired, oxygen and amyl mitrite should be administered.

Immediately flush with large quantities of water for 5 minutes after contact or suspected contact, and completely remove all contaminated clothing (including shoes or boots). Flushing with water for 5 minutes is sufficient to effectively remove cyanide from the patient's skin. Call a physician.

EYE CONTACT

If consciousness is impaired, oxygen and amyl nitrite should be administered.

Immediately flush the eyes with large quantities of water for 5 minutes while holding the eyelids apart.

Do not try to neutralize with "acids" or "alkalies". Eye contact will require further evaluation and possibly treatment. Continue rinsing the eye during transport to the hospital. Call a physician.

INGESTION

If consciousness is impaired, oxygen and amyl nitrite should be administered.

If the patient is conscious, immediately give patient one pint of 1% sodium thiosulfate solution (or plain water) by mouth and induce vomiting. Repeat until vomit fluid is clear. Never give anything by mouth to an unconcious person. Call a physician. Give oxygen.

MEDICAL TREATMENT

EXPERIENCE SHOWS THAT FIRST AID GIVEN PROMPTLY IS USUALLY THE ONLY TREATMENT NEEDED FOR TYPICAL INDUSTRIAL CYANIDE EXPOSURE. LARGER CYANIDE EXPOSURE INCREASES THE NEED FOR MEDICAL TREATMENT.

Do not overact. Although prompt action is essential when poisoning has occured, a lucid, conscious person who can communicate does not have significant cyanide posioning and treatment will rarely be necessary. "Treat what you see" is a good rule of thumb.

(ADDITIONAL INFORMATION AND REFERENCES - Continued)

"Preventive" use of cyanide antidote in the absence of impaired consciousness may not be warranted. Keep the patient calm by reassurance over the next 30 minutes, and closely monitor the patient's condition. Consider assuring intravenous access in cases where significant toxicity is possible but may be delayed. Mildly symptomatic patients who remain alert may be managed by supportive care only.

If cyanide skin contact has been prolonged and/or extensive, watch the individual closely at least 30 minutes to assure there is no delayed absorption into the bloodstream.

INTRAVENOUS ANTIDOTE

Establishment of IV access with normal saline, Ringer's lactate, or other available IV fluid will facilitate administration of the antidote.

1. Sodium nitrite: Adult - 10 mL of 3% solution (300 mg)

   Draw solution from the ampule and inject slowly over 4-5 minutes (2 to 2.5 mL/minute). Monitor blood pressure frequently, and slow the rate of injection if hypotension (low blood pressure) occurs.

2. Sodium thiosulfate: Adult - 50 mL of 25% solution (12.5 grams).

   Follow sodium nitrite with sodium thiosulfate injected at a rate of 2.5 mL/minute (10-20 minutes).

   The total time for injection of both components of the antidote at the recommended rates is lengthly, approximately 20-25 minutes.

AVOID OVERTREATMENT

Both amyl nitrite and sodium nitrite produce methemoglobin. Methemoglobin cannot carry oxygen or carbon dioxide, and therefore its presence reduces the oxygen carring capacity of the blood. This itself is potentially harmful when metheglobin levels exceed 20-30%.

Consider the body weight and condition of the patient when treating a cyanide exposed patient with sodium nitrite. Avoid excessive use. Should injection be stopped for any reason, keep track of the amount administrated in case treatment needs to be restarted.

If symptoms persist or recur after initial treatment, repeat the antidote ot one half the original doses one hour after the original administration. Monitor methemoglobin levels in every patient treated by the intravenous antidote.

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(ADDITIONAL INFORMATION AND REFERENCES - Continued)

RECOVERY AND DISPOSITION

For most accidental inhalation posionings, patients are revived in a few minutes with complete recovery within 1 to 2 hours.

If necessary, the patient should be monitored for 24 to 48 hours. Any patient whose symptoms require the use of IV antidote should be considered for admittance to an intensive care unit.

Observe for return of symptoms. Monitor methemoglobin levels, blood pH and oxygenation through arterial blood gas analysis. Calculate anion gap from serum electrolytes; cyanide poisoning causes lactate accumulation and an anion gap metabolic acidosis.

Delayed neurotoxic effects are not expected consequences of cyanide exposure although these neurotoxic effects may occur if hypoxia (oxygen deficiency) was prolonged or occured following massive cyanide exposure.

ADVERSE EFFECTS

Nitrites can produce hypotension through peripheral vasodilation (widening of the blood vessels). Methemoglobin formation, although considered a therapeutic effect, may cause symptoms if levels exceed 20-30% Recommended doses usually produce methemoglobin levels under 20% Headache, nausea, vomiting, and syncope may follow nitrite administration. While it is important to be aware of the effects from nitrite therapy, there have been no long-lasting effects associated with this treatment regimen for cyanide exposure in DuPont's experience and knowledge.

CAUTION:

DO NOT USE IN MEDICAL APPLICATIONS INVOLVING PERMANENT IMPLANTATION IN THE HUMAN BODY.

Responsibility for MSDS : CHEMICALS & PIGMENTS
MISSISSAUGA, ONTARIO
416-821-3300

End of MSDS